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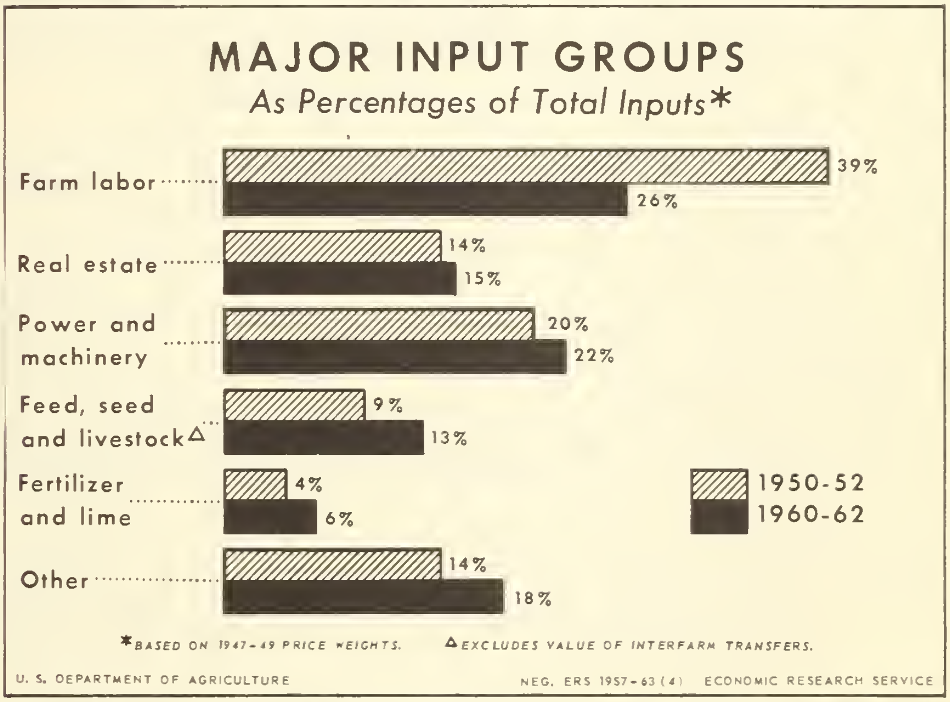
The
FARM COST SITUATION

Farmers have attempted to offset higher prices of production inputs by the use of newer and more effective farming practices. The steady increase of farm output per unit of input--more than a fifth in the last decade--shows the effectiveness of this widespread adoption of new technology. The rapid pace of these changes in production methods is illustrated by the shifts in the relative importance of the various farm inputs since the early 1950's. The declining share of labor and the increasing importance of mechanical power and equipment, fertilizer and lime, and other nonfarm-produced inputs, are outstanding.



MAJOR INPUT GROUPS
As Percentages of Total Inputs*

*BASED ON 1947-49 PRICE WEIGHTS. △EXCLUDES VALUE OF INTERFARM TRANSFERS.

U. S. DEPARTMENT OF AGRICULTURE NEG. ERS 1957-63 (4) ECONOMIC RESEARCH SERVICE

IN THIS ISSUE

Vertical Coordination in Agriculture

Efficiency Gains in Broiler Production

Efficiency and Cost Changes in Cotton Production

Published twice a year by:
ECONOMIC RESEARCH SERVICE **U.S. DEPARTMENT OF AGRICULTURE**

Goods and services used in production: Index numbers of cost rates and prices paid by farmers, United States

(1957-59=100)

Period or year	Commodities, interest, taxes, and wage rates	Commodities only	Feed	Livestock	Motor supplies	Motor vehicles	Farm machinery	Farm supplies	Building and fencing materials	Ferti- lizer	Seed	Wage rates
Average:												
1910-14---:	34	38	50	28	--	--	28	38	26	65	50	17
1915-19---:	50	57	78	43	--	--	36	62	36	95	72	25
1920-24---:	55	55	70	33	1/75	1/34	43	70	43	95	70	31
1925-29---:	55	55	67	33	76	35	43	66	41	86	69	32
1930-34---:	43	43	45	25	60	35	41	55	36	71	46	21
1935-39---:	42	47	53	35	60	39	43	53	37	66	56	21
1940--------:	42	47	50	40	58	40	43	56	38	64	48	22
1941--------:	45	50	54	45	60	42	43	59	40	64	46	26
1942--------:	51	57	66	53	64	45	46	65	44	71	62	34
1943--------:	58	63	78	60	65	47	48	73	46	76	78	45
1944--------:	63	66	87	57	67	51	49	76	49	77	89	54
1945--------:	66	67	86	62	67	53	49	78	50	79	91	62
1946--------:	71	73	100	70	68	55	51	78	55	79	94	66
1947--------:	81	85	118	87	75	63	58	84	72	88	108	72
1948--------:	89	95	125	108	83	71	67	90	80	96	125	76
1949--------:	86	91	103	96	85	78	76	94	79	98	114	74
1950--------:	89	94	105	113	86	78	78	94	81	94	109	73
1951--------:	98	104	118	137	90	83	83	100	89	100	111	81
1952--------:	100	104	126	115	91	87	86	106	90	102	125	87
1953--------:	95	97	114	83	93	86	87	104	91	103	114	88
1954--------:	95	97	113	85	94	86	87	100	90	102	107	88
1955--------:	94	96	106	83	95	87	87	98	92	102	114	89
1956--------:	95	95	103	77	97	89	91	99	96	100	99	92
1957--------:	97	98	101	86	100	96	96	100	99	100	103	96
1958--------:	101	101	99	107	100	100	100	100	99	100	101	99
1959--------:	102	101	100	107	100	104	104	100	102	100	96	105
1960--------:	103	101	97	100	101	102	107	100	102	100	101	109
1961--------:	104	101	98	100	102	101	110	100	101	100	100	110
1962--------:	106	103	100	104	101	106	111	100	101	100	103	114
July------:	105	102	99	100	--	105	--	--	--	--	--	114
Aug.------:	105	102	99	102	--	--	--	--	--	--	--	114
Sept.-----:	106	103	100	107	101	105	112	100	101	100	104	114
Oct.------:	106	103	100	108	--	105	--	--	--	--	--	113
Nov.------:	106	103	100	108	--	--	--	--	--	--	--	113
Dec.------:	107	104	102	106	101	108	112	101	100	--	--	113
1963:												
Jan.------:	108	104	103	108	--	--	--	--	--	--	--	114
Feb.------:	108	104	104	102	--	--	--	--	--	--	111	114
Mar.------:	108	104	104	101	101	109	113	101	101	--	111	114
Apr.------:	108	104	103	103	--	--	--	--	--	100	110	117

1/ 1924 average. Source: Statistical Reporting Service.

THE FARM COST SITUATION

Approved by the Outlook and Situation Board, May 8, 1963

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THE HIGHLIGHTS

Farm production expenses totaled $27.7 billion in 1962, or about $0.6 billion more than in 1961 (table 1). In the first quarter of this year, they were a little higher than a year earlier, and are expected to total $28.2 billion for 1963 as a whole.

The increase in 1962 over the year before was due to the slightly higher prices paid for about the same total volume of production inputs purchased. The rise in farm production expenses since the early 1950's, however, resulted from approximately equal percentage increases in the volume of purchased inputs, and in the level of prices paid for them.

The rise in farm production expenses was more than offset by an increase in gross farm income in 1962, leaving farmers' realized net income just above the year before. Higher gross receipts from marketings of farm products, with an assist from increased Government payments, were responsible for the increase in gross farm income.

Some of the more significant developments in demand, supply, and prices of the principal types of farm production inputs are discussed in the following sections of this report, but here are a few of the highlights:

Farm wage rates averaged slightly higher in 1962 than in the previous year, with all regions and nearly all States sharing in the increase. The supply of skilled farmworkers remains tight, but there is considerable unemployment among unskilled workers. The average number of workers employed on farms in 1962 was below the year before, and further declines are in prospect as farm consolidation and mechanization progresses.

Prices of farm tractors, machinery, and equipment have been rising for several years. Farmers continue to buy more of the larger tractors and bigger-capacity machines, and many farm operators do some custom work with them.

Table 1. - Gross farm income, production expenses, net farm income, and related indexes, 1950 to 1962 1/

Item	1950-54 average	1955-59 average	1960	1961	1962 2/
	Bil. dol.	Bil. dol.	Bil. dol.	Bil. dol.	Bil. dol.
Cash receipts from farm marketings	31.0	31.4	34.0	35.2	35.7
Nonmoney income and Government payments	4.2	4.2	3.9	4.7	4.9
Realized gross farm income	35.2	35.6	37.9	39.9	40.6
Farm production expenses	21.4	23.9	26.2	27.1	27.7
Farmers' realized net income	13.8	11.7	11.7	12.8	12.9
Net change in farm inventories	.5	.3	.3	.2	.1
Farmers' total net income	14.3	12.0	12.0	13.0	13.0
	Index numbers (1957-59=100)				
Volume of farm marketings: 3/					
Livestock and livestock products	86	99	105	109	110
Crops	87	98	113	113	112
All farm products	86	98	108	110	111
Volume of purchased inputs	94	99	103	105	105
Productivity, or output per unit of total input	88	98	105	106	107
Prices received by farmers:					
Livestock and livestock products	112	96	98	97	99
Crops	112	102	99	101	104
All farm products	112	98	98	99	100
Prices paid by farmers for commodities used in production, interest, taxes and wage rates	95	98	103	104	106
Ratio of prices received to prices paid for production items (including interest, taxes and wage rates) 4/	118	100	95	95	94

1/ 48-State data. 2/ Preliminary. 3/ Converted to 1957-59 reference base, using 1947-49 price weights.

4/ Not to be confused with the Parity Ratio, which includes prices paid for items used in family living, and has a 1910-14 base.

Farm service buildings continue to be an important item in farm capital investment. Operators of large farms are considerably more active builders than those with smaller operations and tend to build more specialized structures.

The average cost per unit of plant nutrients in fertilizer has declined in recent years. The chief reason for this is the increasing use of higher-analysis materials, particularly highly concentrated nitrogen materials. Use of fertilizer continues to expand, both in terms of acres fertilized and rates applied per acre. In response, the fertilizer industry is adding to its productive capacity, both by building new plants and expanding existing ones.

In the winter of 1962-63, feed grain prices were slightly higher and high-protein feed prices were sharply higher than a year before. These higher feed prices occurred during a period of declining prices for some of the more important livestock and livestock products. Feed grain production in 1963 may be somewhat higher than last year, but not quite as large in relation to livestock numbers as in the 1962-63 feeding season.

Seed prices, as usual, vary sharply with year-to-year changes in demand and supply. These price changes are cushioned by imports of some kinds of seeds. For example, imports of alfalfa seed from mid-1962 to April 1, 1963 are almost 4 times those for the comparable period a year earlier.

Interest rates charged on farm debt in 1962 averaged a bit higher than the year before. The average amount of farm debt outstanding in 1962, and the total farm interest bill, were each about 9 percent higher than in 1961.

Prices of farm real estate continued their upward trend in the year ended March 1, 1963. Nationally, the increase in average value per acre was about 4 percent in the latest 12-month period, although the southeastern and southcentral States showed somewhat larger increases. These increases in per-acre values, along with a further gain in the average acres per farm, raised the average value of real estate per farm to about $45,000 on March 1, 1963.

On most types of farms for which costs and returns estimates are available, prices paid for production items purchased in 1962 were a little higher than the year before. This was a continuation of a general upward trend since the early days of World War II. Farmers have attempted to offset the impact of these higher prices by adopting newer and more effective production practices and by making adjustments to changing price relationships of the various production input items. As a result, farm machinery and equipment, fertilizers, pesticides, and other nonfarm-produced inputs now make up a somewhat larger part of total production costs on most of these farms than a decade or two ago. On the other hand, the relative importance of labor has declined. Farmers' efforts to hold down production costs have met with some success, as indicated by the fact that, on many of these farms, costs per unit of production have risen less than prices or cost rates of inputs.

FARM LABOR

Farm wage rates for the country as a whole averaged 80 cents per hour on April 1 this year, 2.6 percent higher than on April 1, 1962. In all regions (table 2), and in all States but 2, the April 1 wage rates this spring were higher than a year before. In 14 States the increase amounted to 4 percent or more, but was up less than 2 percent in 11 other States. Increases of these dimensions are expected to continue during the rest of 1963.

In 1962, farm wage rates averaged higher than in 1961 in all States except New York. Higher industrial wages, as usual, were an important factor in this rise in farm rates. However, in the States where contract Mexican nationals are employed, the "adverse-effect" wage determinations made by the Secretary of Labor contributed to an increase in farm wage rates in 1962. These are the minimum rates that may be paid contract Mexican nationals to avoid adverse effects on domestic workers. These determinations were made for 24 States and set at $1.00 per hour for 16 of them, but varied down to 60 cents per hour for the others. 1/ In most of the 24 States, the adverse-effect rate was lower than the 1961 average hourly rate without board and room, but was higher than the composite hourly equivalent of all types of farm wage rates as reported by USDA's Crop Reporting Board.

The composite hourly farm wage rate averaged 86 cents per hour for the whole country in 1962, 3 cents per hour more than was paid in 1961. This was less than the rise in industrial wage rates, and the spread between farm and industrial rates continued to widen (fig. 1). Average hourly earnings of production workers in manufacturing were $2.39 last year and $2.43 during the first quarter of 1963. This differential in wage rates between farm and industrial jobs constitutes the principal inducement for migration from farm to nonfarm jobs. However, opportunities for nonfarm work continue to be limited, and unemployment remains relatively high, particularly among those whose normal employment is as hired farmworkers. An average of 7.3 percent of these workers were without work last year compared with 5.6 percent of all workers. Comparable levels of unemployment prevailed during the first quarter of this year, although there was some improvement in March.

The supply of workers who can operate and maintain agricultural machines, and of dairy and poultry workers, continues tight in some areas. The demand for workers with these skills is expected to be maintained. However, there is considerable unemployment among workers in the lower-skilled categories. A number of projects for training unemployed and underemployed farm and other workers under the Area Redevelopment Act of 1961 and the Manpower Development and Training Act of 1962 are underway or completed. However, few of these projects are in rural areas. With continued mechanization of farm jobs, fewer and fewer unskilled workers can expect to find steady employment on farms. In addition, the overall demand for farmworkers is expected to continue downward.

1/ Employment Service Program Letter No. 1281 (March 29, 1962) and No. 1283 (April 16, 1962), U. S. Department of Labor, Bureau of Employment Security.

Table 2. - Average farm wage rates, by geographic regions, April 1, 1963, and percentage change from April 1, 1962

Region	Average wage rates, April 1, 1963 1/				Percentage change 1962 to 1963 2/
	With board and room per month	Without board or room		Composite, per hour	
		Per day	Per hour		
	Dollars	Dollars	Dollars	Dollars	Percent
New England	162	10.20	1.25	1.03	2.0
Middle Atlantic	156	9.30	1.16	.84	4.4
East North Central	151	9.20	1.14	.76	2.0
West North Central	160	9.70	1.14	.82	3.6
South Atlantic	3/	5.90	.81	.62	2.8
East South Central	3/	5.00	.68	.50	3.1
West South Central	3/	6.70	.83	.69	2.4
Mountain	177	9.40	1.09	.90	2.6
Pacific	230	11.30	1.33	1.29	3.9
48 States	154	6.80	1.11	.80	2.6

1/ Selected from 9 types of rates for which averages are reported. Composite is hourly equivalent of all types of rates.
2/ Based on composite rates per hour.
3/ Relatively unimportant in this region.

Source: Farm Labor, published monthly by the Statistical Reporting Service, USDA.

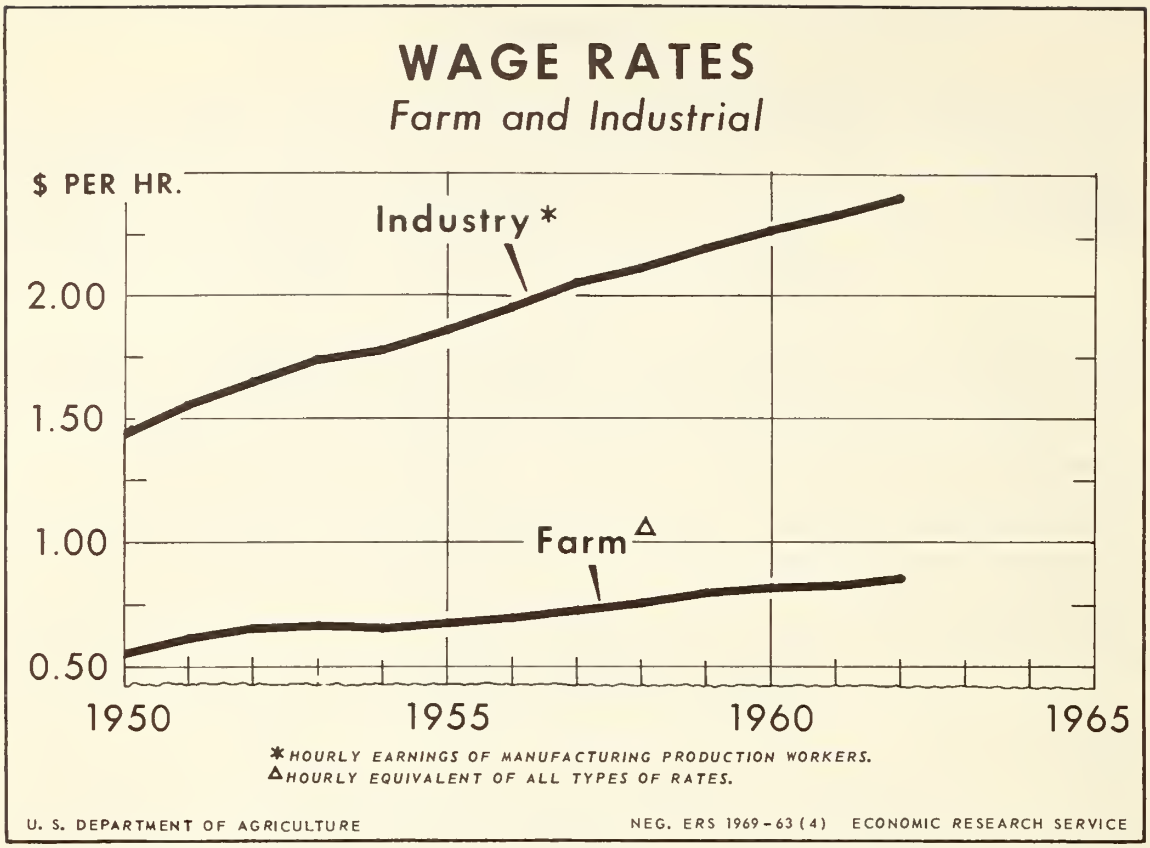


Figure 1

An average of 6.7 million workers were employed on farms last year, about 219,000 fewer than in 1961. Part of this drop was in foreign workers brought in under contract for temporary work on farms. Peak employment of these foreign workers occurred in September, when 127,000 were working on farms. In 1961, the peak was about 221,000 workers. Most of this reduction was in Mexican contract workers, admitted under Public Law 78. This decline was not a net reduction, however, as many other Mexican nationals were admitted as permanent residents under the Immigration and Nationality Act (PL 414). The number of these so-called "green-card workers" or immigrants is not known, but indications are that it is substantial. 2/

If farmers carry out their 1963 plans as indicated on March 1, the total planted acreage of all crops will be the second smallest of record, and only 2 percent above last year's record low. Acreage increases planned in 1963 are chiefly in crops that require relatively little labor--such as corn, wheat, soybeans, and sorghums. These additions to labor demand will be more than offset by reduced acreages of such labor-intensive crops as cotton, tobacco, and potatoes.

2/ Employment Security Review, U. S. Department of Labor, Bureau of Employment Security, Vol. 30, No. 1, January 1963.

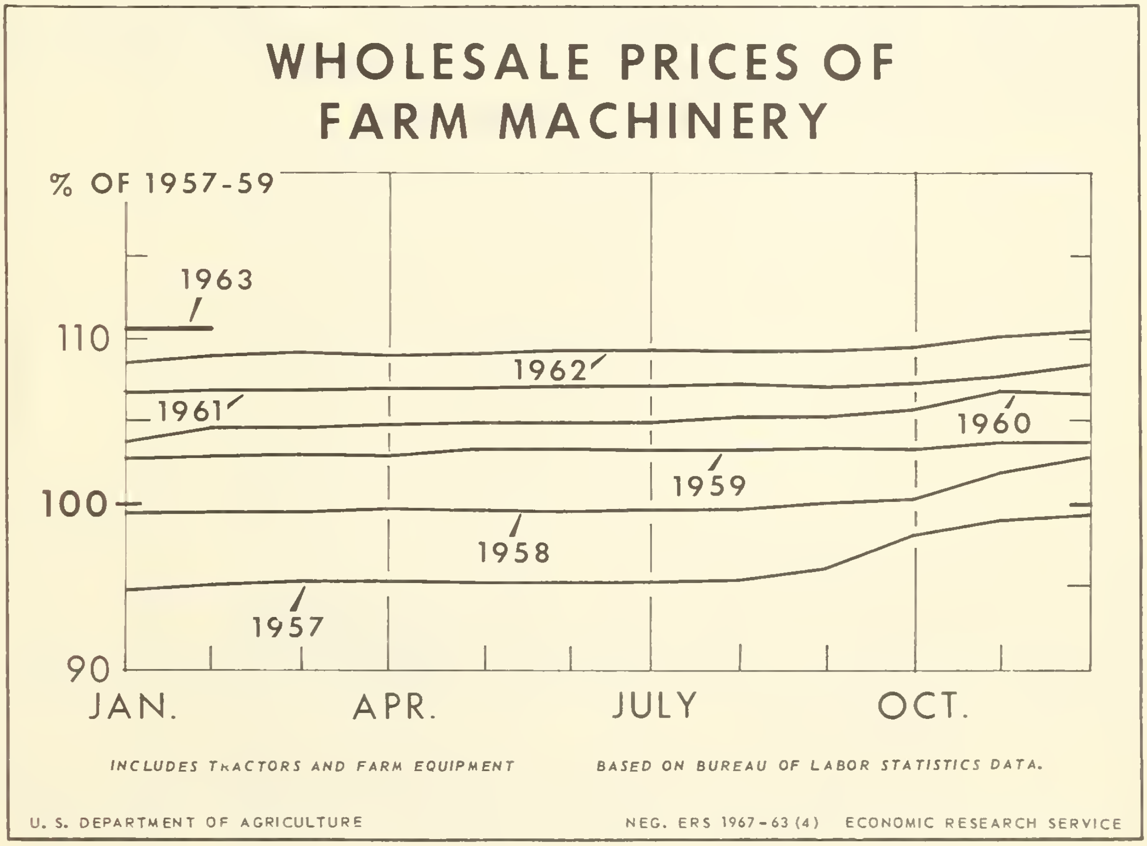
A continued downward trend is the prospect for need for labor on farms. Additional mechanization and automation of farmwork, and continued consolidation of farms into fewer and larger units, are potent forces behind the expected drop in the total demand for farm labor.

NONFARM INPUTS

Farm Power and Machinery

Wholesale prices of tractors, farm machinery, and equipment have risen about 2 percent each year for the last three years, in contrast with a 4-percent increase from 1957 to 1958 (fig. 2). Not only have the recent annual increases been more moderate than formerly, but they tend to be more evenly distributed throughout the year.

Because of the scarcity of competent farmworkers and increasing wage rates, farmers have attempted to cut costs by reducing their use of labor and using larger and more efficient machines. For example, the average farm tractor purchased now has a maximum belt horsepower of about 55. Ten years ago, the average new tractor had approximately 32 horsepower. Also, high-capacity self-propelled combines, balers, windrowers, and sprayers are much more commonly used than before.



INCLUDES TRACTORS AND FARM EQUIPMENT

BASED ON BUREAU OF LABOR STATISTICS DATA.

U. S. DEPARTMENT OF AGRICULTURE

NEG. ERS 1967-63 (4) ECONOMIC RESEARCH SERVICE

Figure 2

These larger machines are used on more acreage annually than the smaller older ones, as indicated by the 1960 Sample Survey of Agriculture. 3/ The average yearly use of pull-type combines cutting 6 feet and less was only 53 acres, compared with 239 acres for the pull-type of 12 feet and over, and 310 acres for the large self-propelled machines. Likewise, 2-row mounted cornpickers were used on nearly 4 times as much acreage as the older, 1-row pull-type (table 3).

Owners of the larger combines and cornpickers are doing more custom work. With the self-propelled combines, an average of only 72 percent of the annual use was on the owner's farm in 1960 compared with 82 percent for pull-type combines.

As more farmers buy cornpickers, forage harvesters, and pickup balers, there is less demand for custom picking, harvesting, and baling. Information from a 1956 study 4/, compared with the 1960 Census survey, shows substantial increases between the two years in the percentage of annual use of these three machines on the owner's farm. On the other hand, the number of combines, mowers, and rakes on farms leveled off some time ago, and a high proportion of their annual use in both 1956 and 1960 was on the owner's farm.

The relatively low yearly acreage on which small combines, cornpickers, and forage harvesters are used indicates a high per-acre overhead cost which may or may not be offset by the advantage of more timely harvesting. Although many of these were bought as used machines and had a low original cost to the present owners, farmers using machines on only 10 to 30 acres annually need to take a hard look at their alternatives. Joint ownership of machines, or custom work, may be the answer. 5/

3/ U. S. Bureau of the Census, U. S. Census of Agriculture: 1959, Vol. V. Special Reports, Part 5, 1960 Sample Survey of Agriculture.

4/ Parsons, Merton S., Robinson, Frank H., and Strickler, Paul E., Farm Machinery: Use, Depreciation and Replacement, Statis. Bul. 269, Agr. Res. Serv., USDA, October 1960.

5/ Helpful evaluations of ownership and rental alternatives are contained in Kans. Agr. Expt. Sta. Bul. 417, What it Costs to Use Farm Machinery, 1960; and "Let's Consider Renting Farm Equipment," Farm Economics, Pennsylvania Agricultural Extension Service, March 1, 1961.

Table 3. - Average annual use of selected field equipment, 48 States, 1956 and 1960

Machine	Average use		Proportion on own farm	
	1956 1/	1960 2/	1956	1960
	Acres	Acres	Percent	Percent
Grain combines, total	119	123	74	76
Pull-type	---	78	--	82
6 feet and under	---	53	--	83
Over 6 feet and under 12	---	97	--	72
12 feet and over	---	239	--	87
Self-propelled	---	275	--	72
10 feet and under	---	177	--	61
Over 10 feet	---	310	--	74
Cornpickers and picker-shellers, total	82	81	69	78
Pull-type	---	52	--	83
1-row	---	36	--	85
2-row	---	89	--	82
Mounted and/or self-propelled	---	123	--	74
1-row	---	63	--	82
2-row	---	131	--	74
Pick-up balers	209	101	56	69
Twine	---	95	--	71
Wire	---	146	--	64
Field forage harvesters	93	47	46	76
Tractor mowers	75	72	88	89
Side delivery rakes	89	73	82	83
Cotton strippers	---	134	--	89
Cottonpickers	---	145	--	83

1/ Parsons, Merton S.; Robinson, Frank H.; and Strickler, Paul E.; Farm Machinery: Use, Depreciation, and Replacement, Statis. Bul. 269, Agr. Res. Serv., USDA, October 1960.

2/ U. S. Bureau of the Census, U. S. Census of Agriculture: 1959, Vol. V, Special Reports, Part 5, 1960 Sample Survey of Agriculture.

Building Materials

Capital expenditures for new construction, additions, and major improvements of farm service buildings exceeded $800 million in 1962. In the last 15 years, they ranged from about $780 million to slightly over $1 billion annually, approximately 2 to 3 percent of total yearly cash receipts.

After the shortages during World War II, capital expenditures on farm buildings rose rapidly, reaching a peak in 1952. In recent years, they have totaled about twice the annual repair costs on farm service buildings. This contrasts strongly to the situation during the war years, when many building materials were hard to get, so farmers put up few new buildings and even kept repairs to a minimum. The wartime capital expenditures totaled only about one-half the annual amounts spent by farmers to repair their service buildings.

The quantity of building materials purchased for capital additions in the last 15 years followed the same general pattern as for expenditures. But because of the upward trend in prices, actual quantities purchased increased less than expenditures in the late 1940's and decreased more than expenditures during the early 1950's. Although quantities purchased remained fairly constant in the last 5 years, they were about a fifth lower than in the immediate postwar period.

As we might expect, operators of large farms are considerably more active builders than those with smaller farm operations. A recent survey shows that farmers with annual marketings of $40,000 and over built 71 new buildings per 100 farms in 1958-60 (table 4); those with less than $2,500 of annual sales constructed only about 8 new buildings per 100 farms in that period. 6/ Operators of the larger farms also were more likely to construct more specialized structures, such as grain storages and silos. In addition, they more frequently built 2 or more poultry houses, hog houses, and grain storages than the smaller farmers in this 3-year period.

Dwellings were the buildings more frequently constructed on the smallest farms (those with less than $2,500 of farm products sold). Dwellings made up a fourth of all buildings constructed on the smallest farms, but only about a tenth on other farms.

Nearly a fourth of all the buildings constructed during this period were barns of various types, and about a fifth were grain storages. Next in importance were dwellings, followed by machine sheds.

The Census survey also provides information on materials used for the different kinds of buildings (table 5). Lumber was still the most important material for exterior walls and framing construction for most types of buildings. Wood poles frequently were used for framing in machine sheds, hog houses, general-purpose barns, and cattle barns. Masonry was used for at least part of the exterior walls on nearly half the dairy barns and 30 percent of the dwellings.

6/ U. S. Bureau of the Census, Census of Agriculture: 1959. Vol. V. Special Reports, Part 5, 1960 Sample Survey of Agriculture.

Table 4. - Number of farm buildings constructed with a value of $100 or more, by value of sales per farm, 1958-60

Kind of building	Number of buildings constructed in 1958-60 on farms with annual farm product sales of--				Total 1/
	$40,000 or more	$10,000 to $39,999	$2,500 to $9,999	Under $2,500	
	Thousands	Thousands	Thousands	Thousands	Thousands
Dwellings	8	26	25	35	94
General-purpose barns	3	17	16	26	62
Barns primarily for milk cows	4	21	13	6	44
Other barns for feeding and sheltering cattle	5	24	23	13	65
Poultry houses	11	19	14	8	52
Hog houses	8	15	21	7	50
Grain storages	15	83	46	11	155
Machine sheds	7	39	28	12	87
Upright silos	6	25	13	1	45
Other	7	23	21	18	69
Total 1/	72	292	219	138	721
	Number	Number	Number	Number	Number
Total per 100 farms	71	42	17	8	19

1/ Items do not necessarily add to totals because of rounding.

Source: U. S. Bureau of the Census, U. S Census of Agriculture: 1959, Vol. V, Special Reports, Part 5, 1960 Sample Survey of Agriculture.

Table 5. - Proportion of various building materials used for exterior walls, framing, and roofs on newly constructed farm buildings, by type of building, 1958-60

Kind of building	Building materials used for--					
	Exterior walls		Framing		Roofs	
	Lumber	Metal	Lumber	Wood poles	Composition	Metal
	Percent	Percent	Percent	Percent	Percent	Percent
Dwelling	52	3	93	3	80	11
General-purpose barns	66	32	64	31	15	82
Barns primarily for milk cows	42	19	64	15	29	64
Other barns for feeding and sheltering cattle	58	40	45	52	17	82
Poultry houses	79	11	71	26	31	58
Hog houses	77	19	55	44	24	68
Grain storage	36	58	37	8	11	82
Machine sheds	51	46	46	48	17	80
Upright silos	11	10	--	--	--	--
Other	59	11	64	22	40	45
Total	51	30	58	24	29	64

Source: U S. Bureau of the Census, U. S. Census of Agriculture: 1959. Vol. V., Special Reports, Part 5, 1960 Sample Survey of Agriculture.

Metal and composition together accounted for more than 90 percent of all new roofs. Metal was by far the most popular roofing material for service buildings, but composition roofing was used for most of the dwellings.

Prefabrication also is becoming noticeable in farm building construction. The Census survey showed that nearly 30 percent of all the farm buildings constructed in 1958-60 used some materials cut to size or partly assembled. Such materials were used in the construction of almost two-thirds of the buildings used for grain storage.

A high proportion of the dwellings built during these 3 years had both electricity and running water. These utilities also were provided in most of the stanchion barns, milking parlors, and poultry houses.

Fertilizer

The average cost per unit of plant nutrients declined in the last several years. The index of the cost per ton of plant nutrients was at 90 in 1962 (1957-59=100), compared with 94 in 1961, 102 in 1956, and 117 in 1950. 7/ The main factor responsible is the increasing use of the high-analysis materials. For example, there has been a marked expansion in the distribution of anhydrous ammonia (82 percent N). In addition, there has been some decline in prices of several fertilizer materials in recent years.

Distribution of plant nutrients to agents, dealers, and consumers in the 50 States and Puerto Rico rose from 7.8 million tons during the year ended June 30, 1961, to about 8.4 million tons the following year, an increase of 7 percent. Supplies available for the year ending June 30, 1963, are estimated at 9.4 million tons, an increase of 9 percent over the preceding year. Supplies of N will be up 10 percent in 1963, primarily in the form of urea, anhydrous ammonia, and ammonium phosphates. Supplies of P_2O_5 will be up about 4 percent, with gains in ammonium phosphate and phosphoric acid more than offsetting slight declines in normal and concentrated superphosphates. Supplies of K_2O will be about 14 percent above those for the year ended June 30, 1962.

Since June 30, 1962, annual capacity for production of anhydrous ammonia, involving 69 plants, has grown to about 6.5 million tons. Ten of these plants came into production in 1962 and early 1963. The 11 additional plants under construction or planned, plus current expansion of existing plants, will add nearly 1.5 million tons to current capacity. Four new plants for producing ammonium nitrate appeared in 1962, and 6 more are under construction or planned. When completed, these will make a total of 31 plants producing ammonium nitrate. Plans for 6 new urea plants have been announced; 18 plants are now producing urea.

Increased capacity for producing concentrated superphosphate has been accomplished largely through expansion of existing facilities. Current capacity for this material is about 1.4 million tons of P_2O_5. Capacity for P_2O_5

7/ This index is computed by dividing total annual expenditures for fertilizer by the corresponding annual combined tonnage of nitrogen (N), phosforous (P_2O_5), and potassium (K_2O).

production in the form of ammonium phosphate is nearly 1 million tons, 56 percent of which is represented by plants coming into production since early 1960. Ten fewer plants produced normal (20 percent P_2O_5) superphosphate in 1961 than in 1960. The continued rise in plant nutrient content of fertilizers is a reflection of the shifts in plant capacity for higher analysis N and P_2O_5 materials. Domestic capacity for production of K_2O, now at 2.9 million tons, will be increased by the completion of a new plant in Utah in 1963 and another in New Mexico in 1964.

Use of fertilizer continues to expand both in terms of acres fertilized and rates applied per acre. Farmers fertilized 48 percent of their cropland and improved pasture in 1959 compared with only 30 percent in 1954. Crops having more than 50 percent of the total acreage fertilized in 1959 were: Tobacco, 99 percent; sugar crops, 92; potatoes and sweetpotatoes, 86; vegetables, 76; fruit, 73; corn, 64; and cotton, 64. Sixty percent of the total quantity of the three principal plant nutrients was applied on feed crops and about 10 percent on food grains. Cotton and vegetables (including potatoes) each received about 9 percent of that total. The average per-acre rate of N applied on all crops and pasture increased by about 10 pounds from 1954 to 1959. There is evidence that the average rate per acre of N applied on corn in the Corn Belt and Lake States increased by about 6 pounds from 1959 to 1962.

FARM-PRODUCED INPUTS

Feed

Feed prices were somewhat higher during the October 1962-March 1963 period than during the same months a year earlier. High-protein feed prices averaged about 18 percent higher and feed grains about 2 percent higher. Mid-April prices for corn averaged \$1.08 per bushel, 9 cents higher than a year earlier, and for sorghum grain were \$1.71 per hundredweight, about 3 cents higher. But oat prices were a little below a year earlier, and barley, at 89 cents per bushel, was 12 cents less (table 6). During the same period, prices for some of the more important livestock and livestock products were declining.

The feed grain acreage to be planted this year, as indicated by USDA's March 1 survey on prospective plantings, may be about 2.6 million acres more than in 1962. If yields of each of the feed grains average the same as in the last few years, with allowance for trend, combined output would be about 151.6 million tons, or 8.5 million tons more than last year. The total 1963-64 supply of feed grains, high-protein feeds, and all other concentrates would still be somewhat below disappearance, resulting in a further reduction of carryover stocks. Grain-consuming animal units are expected to increase to about 175 million in 1963-64. This would be the largest number of animal units ever fed in this country, except for 2 years during World War II when about 193 million units were fed. The supply of feed per animal unit in 1963-64 would be about 2 percent less than in 1962-63.

The mid-April index of prices received for feed grains was 160, with 1910-14=100, 4.6 percent higher than a year earlier. With the increase in feed prices and a general decline in prices of most livestock products, livestock-feed price ratios have become less favorable than a year ago. The hog-corn

Table 6. - Average prices of feed in the United States, April 15, 1961-63

Item	Unit	1961	1962	1963	Percentage change from 1962 to 1963
		Dollars	Dollars	Dollars	Percent
Prices received by farmers:					
Corn	Bushel	0.965	0.988	1.08	9
Oats	do.	.581	.664	.65	-2
Barley	do.	.85	1.01	.887	-12
Sorghum grain	Cwt.	1.48	1.68	1.71	2
Hay, baled	Ton	20.00	21.40	22.50	5
Prices paid by farmers:					
Dairy feed, 16 percent protein	Cwt.	3.66	3.66	3.76	3
Laying feed	do.	4.36	4.35	4.45	2
Broiler grower feed	do.	4.66	4.67	4.75	2
Cotton seed meal, 41 percent protein	do.	4.01	4.28	4.63	8
Soybean meal, 44 percent protein	do.	4.62	4.39	4.79	9
Bran	do.	2.95	3.01	3.11	3
Middlings	do.	2.98	3.05	3.16	4
Alfalfa hay, baled	Ton	31.50	31.30	33.80	8
Average cost of concentrate ration fed to:					
Poultry	Cwt.	3.34	3.41	3.54	4
Milk cows in milk-selling areas	do.	2.91	2.92	3.02	3
Milk cows in cream-selling areas	do.	2.37	2.48	2.55	3

ratio was 12.6 in mid-April compared with 15.7 a year earlier. The egg-feed ratio was 9.2 compared with 9.3 a year earlier. The turkey-feed ratio was 6.2 compared with 6.3 a year earlier. The broiler-feed ratio, however, was 3.3 compared with 3.1 a year earlier.

Prices of high-protein feeds as a group averaged 18 percent higher in the October 1962-March 1963 period than a year earlier, even though both production and domestic use increased about 6 percent. Prices of soybean meal and gluten feed led the increase in high-protein feed prices.

Gross returns from livestock enterprises per dollar of feed cost, as of April 15, 1963, and comparisons with earlier years, are given in table 7. Small increases in gross returns over a year earlier are shown for broilers, sheep raising, and butterfat. However, returns from eggs and turkeys decreased 2 percent, and from milk, beef raising, and hogs 5, 11, and 20 percent, respectively.

Seed

The initial supply (1962 production plus July 1, 1962, carryover) of 26 important kinds of field seeds was 5 percent below a year before and 20 percent below the 1951-60 average. Retail prices paid by farmers for seeds averaged 6 percent higher in mid-April 1963 than a year earlier.

The total 1962 production of 7 important hay and pasture legume seeds was 3 percent below the 1961 output and 28 percent below average. The 1962 alfalfa seed crop was the smallest since 1951, and certified alfalfa seed prices in mid-April 1963 were up more than 20 percent from a year earlier. Prices of common alfalfa, red clover, and white clover on April 15 were 10 to 20 percent higher than 12 months before.

The upward pressure on prices of some of these seeds, which resulted from low 1962 production, has been moderated by increased imports. Imports of alfalfa seed from July 1, 1962 to April 1, 1963, were almost 4 times those for a comparable period a year earlier. Imports of sweetclover seed during the same period were 32 percent below a year earlier, but they were still a substantial part of the total expected supply for 1963 seeding.

The 1962 seed production of a group of 6 important hay and pasture grasses--timothy, redtop, orchardgrass, tall fescue, smooth bromegrass, and crested wheatgrass--was 16 percent below the 1961 total and 24 percent below average. Production of 4 of these 6 grass seeds was below that for 1961, and their prices ranged somewhat higher. Tall fescue and timothy prices in mid-April 1963 were up more than 20 percent over a year earlier. The 1962 seed production of crested wheatgrass, in contrast, was 75 percent higher than the preceding year, and mid-April prices were 26 percent below the same date in 1962.

Table 7.- Gross returns from livestock enterprises per $1.00 of feed costs, United States, based on April 15 prices, 1957-59 average and 1961-63 1/

Livestock enterprise or product	Gross return per $1.00 of feed cost: Average, 1957-59	1961	1962	1963	Percentage change from 1962 to 1963
	Dollars	Dollars	Dollars	Dollars	Percent
Eggs	1.33	1.43	1.33	1.31	-2
Broilers	1.31	1.23	1.26	1.30	3
Turkeys	1.51	1.39	1.41	1.38	-2
Milk	1.97	2.02	1.87	1.78	-5
Butterfat	1.46	1.51	1.27	1.38	9
Hogs	1.87	2.06	1.87	1.50	-20
Sheep raising	1.54	1.28	1.28	1.33	4
Beef raising	2.30	2.30	2.27	2.03	-11
	Index numbers (1957-59=100)				
Eggs	100	108	100	98	---
Broilers	100	94	96	99	---
Turkeys	100	92	93	91	---
Milk	100	103	95	90	---
Butterfat	100	103	87	95	---
Hogs	100	110	100	80	---
Sheep raising	100	83	83	86	---
Beef raising	100	100	99	88	---

1/ The following quantities of feed were used to calculate the cost of feed:

Eggs (per dozen)------------ 7 lbs. poultry ration
Broilers (per lb.)---------- 2.5 lbs. broiler mash
Turkeys (per lb.)----------- 4.5 lbs. poultry ration
Milk (per cwt.)------------- 31 lbs. concentrates and 110 lbs. hay
Butterfat (per lb.)--------- 7.75 lbs. concentrates and 27 lbs. hay
Hogs (per cwt.)------------- 7.5 bu. corn and 20 lbs. soybean meal
Sheep and lambs (per cwt.)-- 2 bu. corn and 1,500 lbs. hay
Beef raising (per cwt.)----- 3 bu. corn and 600 lbs. hay

To estimate costs of all harvested forages and pasture in the above quantities of feed, feeds from these sources were converted into hay equivalent and the price received by farmers for "all hay" was applied. Feed nutrients from pasture were assumed to cost one-fourth as much as the nutrients in hay. About one-third of the feed consumed by sheep is used in the production of wool. During the period 1957-63, the quantities of broiler mash used to calculate the broiler feed costs were: 1957-60, 2.8 pounds; 1961, 2.6 pounds; 1962-63, 2.5 pounds. During the same period, the quantities of poultry ration used to calculate turkey feed costs were: 1957-61, 4.75 pounds; 1962-63, 4.5 pounds.

INTEREST CHARGES

Interest rates charged on the total outstanding farm debt averaged fractionally higher in 1962 than in 1961. The amount of credit used by farmers, both short-term and long-term, has shown a strong upward trend for several years. The total outstanding farm debt averaged about 9 percent higher in 1962 than in 1961. Reflecting this increased use of credit, and the slight change in rates, the farm interest bill in 1962 is estimated at about $1.5 billion, an increase of about $125 million, or 9 percent, over that in 1961.

Changes in interest rates in the central money markets continued small during 1962. Short-term rates fluctuated in a narrow range at a slightly higher level than in 1961. Rates on long-term Government bonds drifted downward slightly during 1962. In mid-April this year, rates on Treasury bills were approximately the same as at the end of 1962, but rates on long-term bonds had risen a little. Rates probably will not change much during the next several months.

Trends in interest rates have reflected, in part, Federal Reserve monetary policy. This policy has the dual aims of promoting domestic economic growth by holding down long-term interest rates and helping to cope with this Nation's balance of payments problem by minimizing downward pressures on short-term rates, thereby limiting the incentives for short-term funds to move abroad.

Interest rates charged by the production credit associations were lower in 1962 than in 1961, but have changed little since the end of 1962. On April 1, 1963, three-fifths of the associations were charging 6 percent, slightly more than one-fourth were charging over 6 percent, and the rest were charging below 6 percent. Rates charged by commercial banks on their nonreal estate farm loans averaged a little higher in 1962 than in 1961, even though their rates may have declined slightly in the latter half of 1962.

Rates charged on farm mortgage loans by life insurance companies in the last half of 1962 were slightly lower than in the first half of the year. Rates charged by the Federal land banks were unchanged from mid-1961 until late 1962. Effective December 1, 1962, one bank reduced its rate, on a temporary basis, by 0.5 percent to 5 percent; and effective January 1, 1963, one bank temporarily reduced its rate by 0.3 percent to 5.2 percent. Of the other 10 banks, 8 were charging 5.5 percent (one on a temporary basis, with a 6-percent contract rate), one 5.75 percent, and one 6 percent.

Interest rates on the outstanding farm mortgage debt in 1962 averaged fractionally higher than in 1961, even though rates on new loans edged down a little. The rate charged on the new loans made during the year averaged higher than the rate on the old loans retired or partly paid. The interest rate on the outstanding farm mortgage debt in 1962 is estimated at 5.2 percent.

Outstanding farm debt (excluding CCC loans) on January 1, 1963, is estimated at $28 billion compared with $25.5 billion a year earlier. Farm mortgage debt increased an estimated $1.5 billion during 1962, or 11 percent, and nonreal estate debt $1 billion, or 9 percent.

Market prices of farm real estate continued to advance in the year ended March 1, 1963, reaching a new record high nationally of $130.50 per acre. This was 4.5 percent higher than a year earlier and 2 percent above last November. Because of these higher land prices, and the continuing increase in the average size of farm, the average value of land and buildings per farm advanced to about $45,000 (table 8), compared with $42,000 in 1962. 8/

Table 8. - Farm real estate: Estimated average value of farmland and buildings per acre, March 1, 1950 to 1963, and value per farm, 1963, by farm production regions, selected years

Region	Value per acre 1/					Increase, 1962 to 1963	Value per farm, 1963 2/
	1950	1955	1960	1962	1963		
	Dols.	Dols.	Dols.	Dols.	Dols.	Pct.	Dols.
Northeast	108	138	187	198	206	4	33,100
Lake States	89	113	157	163	165	1	30,500
Corn Belt	133	177	234	236	244	3	47,100
Northern Plains	47	59	75	79	83	5	54,100
Appalachian	82	104	142	157	165	5	19,600
Southeast	52	76	133	151	159	5	32,600
Delta States	63	84	124	135	143	6	25,700
Southern Plains	47	63	86	94	103	10	66,600
Mountain	22	30	43	46	48	4	94,500
Pacific	112	161	229	254	264	4	114,800
48 States 3/	65	85	117	125	131	5	44,600

1/ Based on census estimates and revised annual index of average value per acre.

2/ Numbers of farms and acreage of land in farms were extrapolated from the 1959 Census of Agriculture on the basis of the changes shown by the USDA estimates. Estimates for 1963 are preliminary.

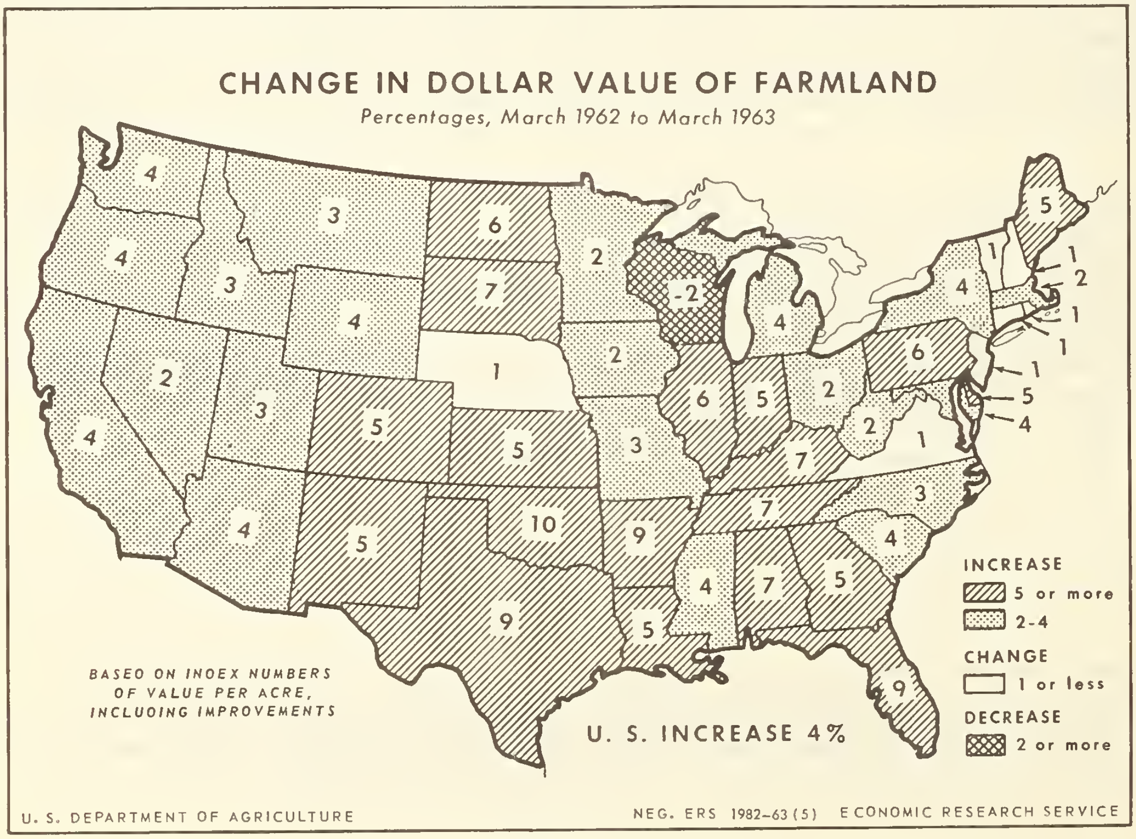
3/ Data not available for Alaska and Hawaii.

8/ Additional information pertaining to farm real estate will appear in a forthcoming issue of Farm Real Estate Market Developments, published 3 times a year by Farm Prod. Econ. Div., Econ. Res. Serv., USDA.

As in the last several years, the increases in average value per acre in the year ended March 1963 were somewhat larger in the Southeast and South Central States than elsewhere. Oklahoma, Arkansas, Texas, and Florida reported increases of 9 percent or more in the latest 12 months ended this March 31 (fig. 3). Rates of increase were substantially less in the Midwest, although values in Illinois, Indiana, North Dakota, and South Dakota strenghtened considerably more during these 12 months than in other recent comparable periods. The purchase of additional land to enlarge existing farms continues to provide strong underlying demand for land and has contributed to the rise in market values in most commercial farming areas in the past decade (fig. 4).

The range in dollar values per acre continues to be quite large, even when States are grouped according to the general characteristics of their agriculture. Lowest values prevail in the Mountain region, where a high proportion of the land in farms is used for grazing. The 3 Pacific States have the highest value, chiefly because of the substantial acreage of high-valued irrigated lands in California. The Corn Belt ranks next in average value, although several States in the Northeast have higher values because of their proximity to large Eastern metropolitan centers.

Average values per farm show an even wider range among regions because of the marked differences in average size of farm. Lowest per-farm values are found in the Appalachian and Delta States, where farm acreages are small because of the relatively high proportion of part-time and retirement farms. Farms in the Mountain and Pacific regions are at the upper end of the range, with an average value of about $100,000.


CHANGE IN DOLLAR VALUE OF FARMLAND
Percentages, March 1962 to March 1963
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INCREASE
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CHANGE
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DECREASE
▩ 2 or more
BASED ON INDEX NUMBERS OF VALUE PER ACRE, INCLUDING IMPROVEMENTS
U. S. INCREASE 4%
U. S. DEPARTMENT OF AGRICULTURE
NEG. ERS 1982-63 (5)
ECONOMIC RESEARCH SERVICE

Figure 3

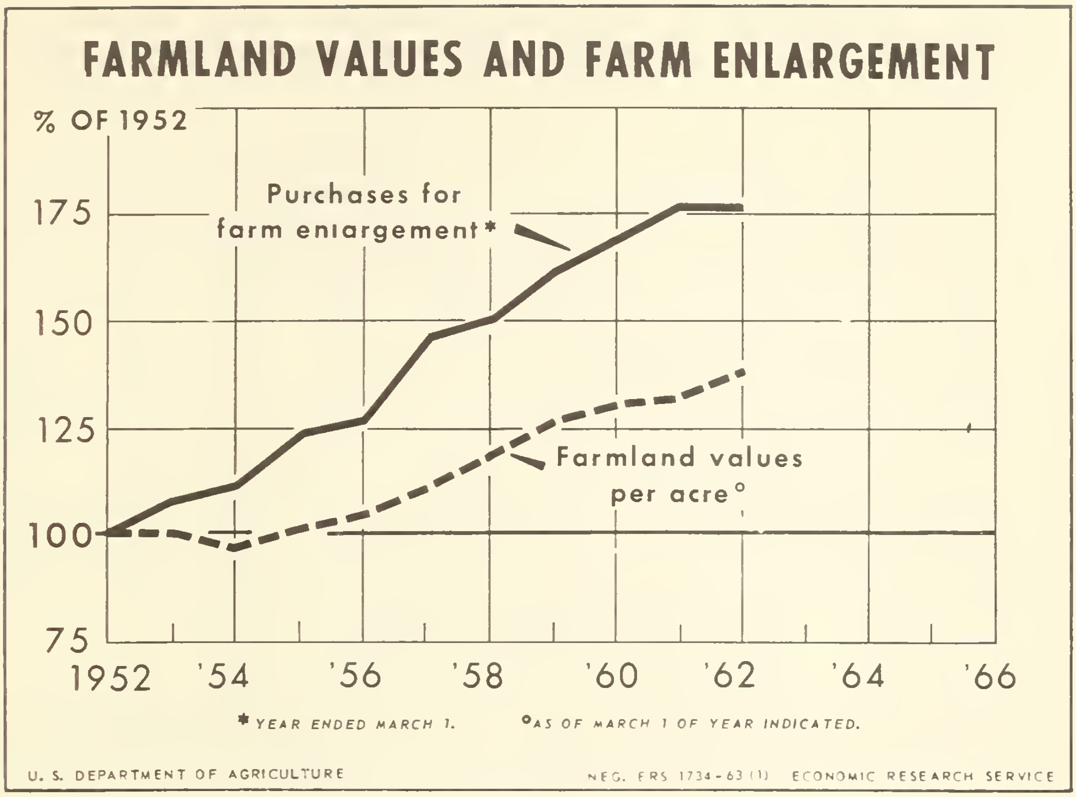

Figure 4

Cash Rents

Cash rental rates for the 1963 season will be higher than last year for farms in 11 of the 12 States where this method of renting is most common (table 9). The increases are about proportional to the rise in market values of cash-rented farms, with the result that the ratios of cash rents to values remain essentially unchanged. Gross rents in these States have ranged between 5.5 and 8.9 percent of market value for the last several years. Net rental returns to landlords after real estate taxes and upkeep of buildings would be 1.5 to 2.0 percent less than the gross rental returns.

Rental rates for pasture on both a per-acre and a per-head basis also will be higher in 1963 than last year (tables 10 and 11). Rates per head are higher in 8 of the 10 regions, and the national average of $3.05 per head per month is the highest since estimates were first obtained in 1958. Pasture conditions as of April 1, 1963, were about normal for the country as a whole, but reduced feed supplies as a result of drought in several areas of the country last year have strengthened the demand for pastures this spring. The buildup in cattle numbers in the Great Plains and Mountain regions also has contributed to active demand for pastureland this spring. Strong demand is reported for pasture in the Flint Hills area of Kansas, where large acreages are typically rented for grass fattening of beef cattle raised in nearby States.

Table 9. - Farms rented wholly for cash: Gross cash rent per acre and ratio of rent to value, Corn Belt, Lake States, and Northern Plains, April 1, 1960-63 1/

State	Cash rent per acre				Ratio of gross rent to value			
	1960	1961	1962	1963	1960	1961	1962	1963
	Dol.	Dol.	Dol.	Dol.	Pct.	Pct.	Pct.	Pct.
Ohio	12.55	13.15	13.20	14.40	5.5	5.8	5.8	5.5
Indiana	18.10	18.25	19.05	19.95	6.7	7.0	7.4	7.2
Illinois	20.55	20.75	20.65	22.15	5.4	5.7	5.6	5.7
Iowa	17.40	17.10	18.30	18.85	6.2	6.5	6.5	6.7
Missouri	9.00	9.95	9.60	11.00	7.3	7.5	6.8	7.4
Michigan	12.60	12.45	12.95	13.05	6.4	6.0	6.1	6.2
Wisconsin	13.60	12.90	13.20	14.80	8.7	8.1	8.3	8.7
Minnesota	13.45	13.65	13.95	14.15	7.1	7.2	7.4	7.4
North Dakota	4.75	4.55	4.65	5.15	8.9	8.4	8.3	8.6
South Dakota	5.20	5.70	5.20	5.55	7.1	7.3	6.7	6.9
Nebraska	7.40	8.05	9.90	9.40	6.1	6.5	7.4	6.9
Kansas	7.25	7.10	7.90	8.45	6.5	6.0	6.8	7.0

1/ Estimates based on data obtained from crop reporters, Statis. Rptg. Serv., USDA.

Table 10. - Pastureland: Gross cash rent per acre and ratio to value, Corn Belt, Lake States, and Northern Plains, April 1, 1960-63 1/

State	Cash rent per acre				Ratio of gross rent to value			
	1960	1961	1962	1963	1960	1961	1962	1963
	Dol.	Dol.	Dol.	Dol.	Pct.	Pct.	Pct.	Pct.
Ohio	7.00	7.00	6.85	8.05	5.0	4.9	4.8	5.0
Indiana	8.75	9.40	10.05	8.50	4.7	5.1	5.8	4.8
Illinois	8.80	8.20	8.40	8.95	3.6	3.7	3.8	3.5
Iowa	9.20	9.10	9.60	10.10	5.2	5.4	5.3	5.4
Missouri	5.40	6.10	6.15	6.55	5.9	6.1	6.0	6.3
Michigan	5.05	4.60	5.15	5.30	6.3	5.6	5.9	5.8
Wisconsin	6.05	5.55	5.80	6.70	9.1	8.3	8.6	9.2
Minnesota	6.30	6.40	6.35	6.65	7.0	7.3	7.5	7.5
North Dakota	1.75	1.80	1.90	2.00	5.9	5.9	5.5	5.6
South Dakota	2.30	2.65	2.50	2.60	5.5	6.0	5.4	5.4
Nebraska	4.15	4.15	5.05	4.40	5.8	5.8	7.1	5.8
Kansas	3.50	3.25	3.70	4.00	5.0	4.9	5.1	5.2

1/ Estimates based on data obtained from crop reporters, Statis. Rptg. Serv., USDA.

Table 11. - Average rate per head per month for pasturing cattle on privately owned land, 1962 and 1963 seasons, by farm production regions 1/

Region	Rate per head		Region	Rate per head	
	1962	1963		1962	1963
	Dollars	Dollars		Dollars	Dollars
Northeast	2.40	2.50	Delta	1.30	1.35
Lake States	1.80	1.80	Southern Plains	2.25	2.60
Corn Belt	2.20	2.30	Mountain	3.15	3.30
Northern Plains	3.10	3.30	Pacific	3.95	3.80
Appalachian	2.15	2.20			
Southeast	1.85	2.00	48 States	2.90	3.05

1/ As estimated by crop reporters, April 1. Statis. Rptg. Serv., USDA.

COSTS BY TYPE OF FARM

Changes in prices of production items do not affect all farmers alike. Cost relationships differ by regions, and certain types of production inputs are much more important on some types of farms than on others. A look at the costs and returns on 39 types of farms, representative of important segments of U. S. agriculture, shows how the impact of these changes differs among farms of various types and locations (fig. 5)[9].

From 1961 to 1962, several developments occurred which affect farm costs. A slight rise in prices paid on most types of farms tended to increase operating expenses per unit of production (tables 12 and 13). In many areas, the rise in per-acre land values meant higher costs to farmers who were enlarging or starting new operations. In other areas, the rise in land values was more than offset by savings from lower interest rates on mortgages. The continued adoption of new technology, such as chemical weed control and mechanization, offset some of the effects of higher prices paid for purchased items used in production. Frequently, the effects of improved technology and other changes are obscured by year-to-year variations in weather. For this reason, it usually is necessary to compare data for a period of years to determine the effect of these nonweather changes on costs and farm production efficiency.

Of a selected group of 14 types of farms, 13 showed increases in average prices paid for purchased inputs from 1947-49 to 1960-62 (table 14). The increases varied from 13 percent on small cotton farms in the Mississippi Delta to 48 percent on cattle ranches in the Intermountain Area. A significant part of these differences was due to changes in wage rates. For instance, hourly wage rates increased 69 percent on Intermountain cattle ranches from

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[9] See Farm Costs and Returns, Commercial Farms, by Type, Size and Location, Agr. Inform. Bul. 230, Econ. Res. Serv., USDA, Revised October 1962.

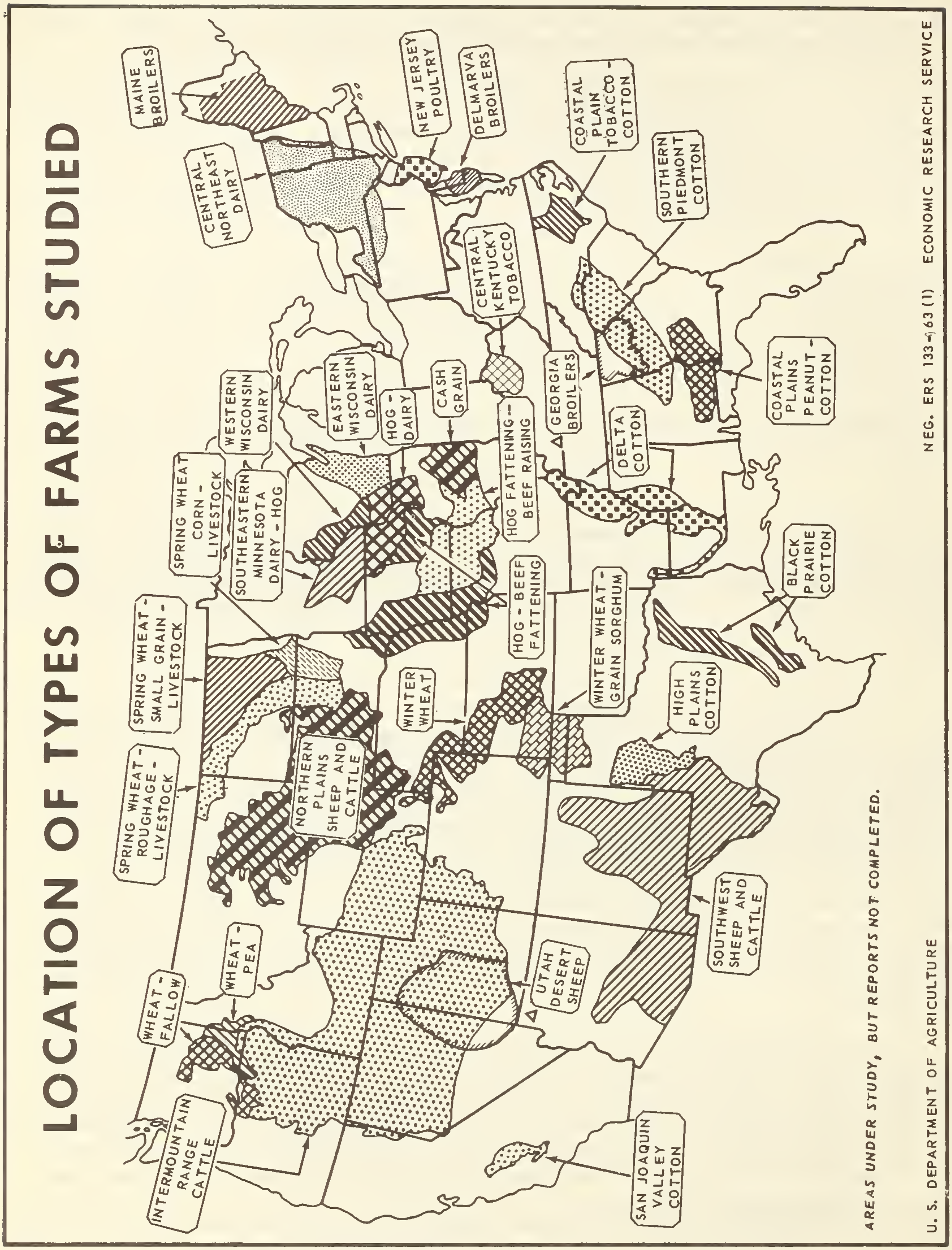
LOCATION OF TYPES OF FARMS STUDIED
INTERMOUNTAIN RANGE CATTLE
WHEAT - FALLOW
WHEAT - PEA
SPRING WHEAT - ROUGHAGE - LIVESTOCK
SPRING WHEAT - SMALL GRAIN - LIVESTOCK
SPRING WHEAT CORN - LIVESTOCK
SOUTHEASTERN MINNESOTA DAIRY - HOG
WESTERN WISCONSIN DAIRY
EASTERN WISCONSIN DAIRY
HOG - DAIRY
CASH GRAIN
HOG FATTENING - BEEF RAISING
HOG - BEEF FATTENING
WINTER WHEAT
NORTHERN PLAINS SHEEP AND CATTLE
UTAH DESERT SHEEP
SOUTHWEST SHEEP AND CATTLE
SAN JOAQUIN VALLEY COTTON
HIGH PLAINS COTTON
WINTER WHEAT - GRAIN SORGHUM
BLACK PRAIRIE COTTON
DELTA COTTON
GEORGIA BROILERS
COASTAL PLAINS PEANUT - COTTON
CENTRAL KENTUCKY TOBACCO
SOUTHERN PIEDMONT COTTON
COASTAL PLAIN TOBACCO - COTTON
DELMARVA BROILERS
NEW JERSEY POULTRY
CENTRAL NORTHEAST DAIRY
MAINE BROILERS
Δ AREAS UNDER STUDY, BUT REPORTS NOT COMPLETED.
U. S. DEPARTMENT OF AGRICULTURE
NEG. ERS 133-63 (1)
ECONOMIC RESEARCH SERVICE

Figure 5

Table 12. - Net farm income, prices received and prices paid, specified types of commercial farms, 1961 and 1962

Type and location of farm	Net farm income		Index 1957-59=100			
	1961	1962 2/	Prices received		Prices paid 1/	
			1961	1962 2/	1961	1962 2/
	Dols.	Dols.	Pct.	Pct.	Pct.	Pct.
Dairy farms:						
Central Northeast	4,497	3,549	97	95	103	104
Eastern Wisconsin:						
Grade A	6,694	6,221	104	100	106	108
Grade B	3,437	3,118	105	102	104	108
Western Wisconsin, Grade B	4,310	4,430	104	101	105	108
Dairy-hog farms, Southeastern Minnesota	4,868	4,409	106	101	103	105
Poultry farms:						
New Jersey, egg-producing	4,959	3,017	98	94	91	93
Maine, broilers	3,776	4,137	103	110	110	110
Delmarva, broilers	5,321	5,542	102	108	104	105
Corn Belt farms:						
Hog-dairy	5,972	5,394	105	101	103	107
Hog fattening--beef raising	4,042	3,616	102	104	103	107
Hog-beef fattening	7,393	10,183	95	108	98	96
Cash grain	8,995	9,061	102	102	102	102
Cotton farms:						
Southern Piedmont	2,666	2,729	100	102	103	104
Mississippi Delta:						
Small	2,035	2,012	103	102	101	103
Large-scale	30,349	30,986	104	105	104	105
Texas:						
Black Prairie	3,297	3,562	106	103	104	105
High Plains (nonirrigated)	13,275	6,804	106	104	105	110
High Plains (irrigated)	23,350	19,617	107	105	105	108
San Joaquin Valley, Calif. (irrigated):						
Cotton-specialty crop	13,516	31,374	90	107	109	109
Cotton-general crop (medium-sized)	24,491	25,602	105	102	108	110
Cotton-general crop (large)	75,778	79,731	105	102	107	109
Peanut-cotton farms, Southern Coastal Plains	4,112	3,747	101	104	98	102
Tobacco farms:						
North Carolina Coastal Plain:						
Tobacco	6,816	6,364	113	105	106	108
Tobacco-cotton	6,857	6,481	112	105	106	108
Kentucky Bluegrass:						
Tobacco-livestock, Inner Area	7,441	7,652	101	96	102	104
Tobacco-dairy, Intermediate Area	2,910	2,805	104	96	104	104
Tobacco-dairy, Outer Area	5,126	5,524	103	97	104	106
Spring wheat farms:						
Northern Plains:						
Wheat-small grain-livestock	135	11,081	123	100	100	103
Wheat-corn-livestock	5,307	5,864	104	104	103	107
Wheat-roughage-livestock	1,391	9,815	110	93	98	105
Winter wheat farms:						
Southern Plains:						
Wheat	10,693	11,260	102	110	105	105
Wheat-grain sorghum	13,400	10,729	101	107	104	104
Pacific Northwest:						
Wheat-pea	11,103	17,714	103	108	101	104
Wheat-fallow	12,084	15,734	104	107	104	106
Cattle ranches:						
Northern Plains	6,277	7,252	98	117	94	98
Intermountain Region	9,998	11,730	98	104	107	109
Southwest	8,167	8,237	97	102	107	110
Sheep ranches:						
Northern Plains	6,831	11,850	81	97	98	98
Southwest	8,652	9,267	86	92	105	104

1/ Including wages paid to hired farm labor. 2/ Preliminary.

Table 13 . - Operating expense and total cost per unit of production, and crop yields, specified types of commercial farms, 1961 and 1962

Index numbers (1957-59=100)

Type and location of farm	Per unit of production				Crop yields per acre 2/	
	Operating expenses		Total cost			
	1961	1962 1/	1961	1962 1/	1961	1962 1/
Dairy farms:						
Central Northeast	104	110	101	106	111	97
Eastern Wisconsin:						
Grade A	102	104	100	102	114	111
Grade B	97	99	97	100	114	112
Western Wisconsin, Grade B	98	95	98	94	112	117
Dairy-hog farms, Southeastern Minnesota	107	110	101	103	111	107
Poultry farms:						
New Jersey, egg-producing	87	90	89	91	---	---
Maine, broilers	98	104	98	101	---	---
Delmarva, broilers	93	99	95	101	---	---
Corn Belt farms:						
Hog-dairy	112	119	110	115	104	105
Hog fattening--beef raising	113	125	108	117	102	96
Hog-beef fattening	111	121	106	110	107	110
Cash grain	111	115	96	98	117	116
Cotton farms:						
Southern Piedmont	98	99	97	99	108	111
Mississippi Delta:						
Small	101	101	95	97	112	108
Large-scale	89	88	90	90	111	107
Texas:						
Black Prairie	107	105	108	104	93	106
High Plains (nonirrigated)	90	120	84	122	137	89
High Plains (irrigated)	89	100	86	97	122	114
San Joaquin Valley, Calif. (irrigated):						
Cotton-specialty crop	113	111	112	113	103	103
Cotton-general crop (medium-sized)	113	109	113	109	94	100
Cotton-general crop (large)	116	111	114	111	95	101
Peanut-cotton farms, Southern Coastal Plains	90	101	87	98	120	111
Tobacco farms:						
North Carolina Coastal Plain:						
Tobacco	97	97	94	94	122	125
Tobacco-cotton	97	96	94	94	118	121
Kentucky Bluegrass:						
Tobacco-livestock, Inner Area	108	105	106	102	101	110
Tobacco-dairy, Intermediate Area	101	99	101	99	105	112
Tobacco-dairy, Outer Area	108	98	103	97	104	113
Spring wheat farms:						
Northern Plains:						
Wheat-small grain-livestock	208	60	212	61	44	194
Wheat-corn-livestock	99	94	103	99	96	122
Wheat-roughage-livestock	139	53	145	53	62	196
Winter wheat farms:						
Southern Plains:						
Wheat	94	99	92	98	121	125
Wheat-grain sorghum	84	102	76	92	140	124
Pacific Northwest:						
Wheat-pea	114	93	117	97	80	115
Wheat-fallow	121	109	128	113	82	105
Cattle ranches:						
Northern Plains	87	102	95	105	86	99
Intermountain Region	115	113	114	112	94	101
Southwest	98	104	98	103	100	97
Sheep ranches:						
Northern Plains	108	103	108	98	86	99
Southwest	96	101	96	104	100	97

1/ Range conditions on ranches. 2/ Preliminary.

Table 14. - Changes in proportion of purchased inputs, production per unit of input, prices paid, cost rates, and costs per unit of production from 1947-49 to 1960-62, specified types of commercial farms

Type and location of farm	Proportion of purchased inputs		Production per unit of input 1/	Prices paid 1/	Cost rates 1/ 2/	Per unit of production 1/	
	1947-49	1960-62				Operating expense	Total cost
	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Dairy farms:							
Central Northeast	66	73	115	120	134	116	116
Western Wisconsin, grade B	49	55	144	119	128	93	88
Corn Belt farms:							
Hog-beef fattening	64	75	105	120	125	134	120
Cash grain	52	57	127	135	146	131	114
Egg-producing farms, New Jersey 1/	79	81	115	83	90	72	78
Cotton farms:							
Mississippi Delta:							
Small	54	68	104	113	125	136	119
Large-scale	86	83	130	3/ 115	123	84	95
High Plains, Texas (nonirrigated)	68	65	140	126	128	86	90
San Joaquin Valley, Calif. (irrigated) 4/ Cotton-general crop (medium sized)	76	75	129	143	145	109	112
Tobacco-livestock farms, Inner Bluegrass Area, Ky. 1/	52	56	106	130	138	132	130
Wheat farms:							
Wheat-small grain-livestock farms, Northern Plains	57	58	120	123	129	136	140
Wheat, Southern Plains	51	51	114	130	137	109	114
Wheat-pea, Pacific Northwest	52	52	111	127	139	114	124
Cattle ranches, Intermountain region 1/	40	49	114	148	138	159	123

1/ 1947-49=100.

2/ Includes charges for operator and family labor and the use of capital in addition to prices paid for purchased items.

3/ Includes cropper labor.

4/ Cotton-general crop farms (medium-sized).

1947-49 to 1960-62, but only 10 percent on cotton farms in the High Plains. The large increases on some types of farms, such as those on the cotton-general farms in the San Joaquin Valley of California, were due to the large amount of labor and machinery used and the relatively large increase in area wage rates and machinery prices during the period. On the other hand, several of these types of farms showed only small increases in the level of prices paid during the 1950's, because commercial fertilizer is a relatively large part of their total production costs, and fertilizer prices have increased less than those of almost any other production input, or in some cases actually declined.

The one type of farm among the selected group of 14 that showed a lower level of prices paid in 1960-62 than in 1947-49 was egg-producing farms in New Jersey. Average prices paid on these farms declined 17 percent in this period, because of a 25-percent reduction in feed prices. Purchased feed accounts for about three-fourths of total cash expenditures on these farms.

The index of cost rates for all production items[10/] generally increased more than the index of prices paid for purchased items. This is because of the large increase in wage rates, interest rates, and value per acre of land and buildings. Interest rates, used to calculate the capital charge for investment, increased from an average of about 4.0 percent in 1947-49 to over 5.5 percent in 1960-62.

On all types of farms except one, however, total cost per unit of production either increased less or decreased more than the index of total cost rates. This was because of the general increase in farm production efficiency. In several instances, such as the grade B dairy farms in eastern Wisconsin and large-scale cotton farms in the Mississippi Delta, increased efficiency more than offset the rise in cost rates. Therefore, on these types of farms, total cost per unit of production was less in 1960-62 than in 1947-49.

The increase in efficiency (output per unit of input) varied from 4 percent on small cotton farms in the Mississippi Delta to 44 percent on grade B dairy farms in western Wisconsin. Mechanization and some of the improved practices were adopted much slower on the small cotton farms in the Mississippi Delta than on other types of farms. The smaller cotton acreages on cotton farms after 1953 also offset some of the increase in efficiency by reducing the acreage of the most advantageous crop. The large increase in efficiency on dairy farms in western Wisconsin was due to the combined effect of increased yields per acre, improved milk production per cow, and increased mechanization. Some of the variation between types of farms occurred because adoption of some improved practices, such as hybrid seed corn, took place on some types of farms before 1947-49, but afterward on others.

[10/] This is a new index which differs from the index of prices paid in that it includes, in addition to prices paid for purchased items, imputed prices for the unpaid inputs of operator and family labor and farmer-owned capital/

In addition to the adoption of new technology, farmers generally decreased the use of production items with the sharpest increases in prices and increased their use of items with less than average increases in prices paid (table 15). Hired labor is the most important example of the former production item, and commercial fertilizer is an important example of the latter. Although the increase in wage rates, relative to prices paid for many other production items, may have stimulated the adoption of new technology, many of these developments would have taken place at any price relationships existing in the past 16 years. For instance, the shift from hand to machine harvesting of cotton continued, even though hand-picking and snapping wage rates declined after about 1952 and were lower in the Mississippi Delta and Texas in 1960-62 than in 1947-49.

If farmers had not made this shift in the composition of production inputs, the increases in average prices paid shown in table 14 would have been much higher than they were. For example, on cash grain farms in the Corn Belt, average prices paid increased 43 percent when weighted by inputs used in 1947-49, but only 35 percent when weighted by inputs used in 1960-62.

Operating expenses per unit of production frequently increased more than total cost per unit of production. This situation usually occurred on farms with an increase in the proportion of purchased inputs. The increase in proportion of purchased inputs may have resulted from an increase in size of farm or a change in method of operation involving increased cash inputs per acre. In contrast, operating expense per unit of production increased less than total cost on a few farms such as large-scale cotton farms in the Mississippi Delta and cotton-general farms in California. On these farms, the sharp reduction in labor used resulted in a reduction in the proportion of purchased inputs. The shifts from man labor to mechanical power also resulted in an increased capital charge for additional working capital.

Table 15. - Percentage distribution of operating inputs, specified types of commercial farms, averages, 1947-49 and 1960-62
(1947-49 price weights)

Type and location of farm	1947-49				1960-62			
	Hired labor	Feed, seed, and livestock	Fertilizer and lime	Other operating expenses	Hired labor	Feed, seed, and livestock	Fertilizer and lime	Other operating expenses
	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Dairy farms:								
Central Northeast	11	47	4	38	5	48	4	43
Western Wisconsin, grade B	8	28	4	60	4	27	6	63
Corn Belt farms:								
Hog-beef fattening	6	57	2	35	3	71	2	24
Cash grain	7	15	7	71	3	18	15	64
Egg-producing farms, New Jersey 1/	7	77	--	16	3	82	--	15
Cotton farms:								
Mississippi Delta:								
Small	30	13	5	52	16	12	7	65
Large- scale	56	6	6	32	32	7	8	53
High Plains, Texas (nonirrigated)	37	8	--	55	19	6	--	75
San Joaquin Valley, Calif. (irrigated) 2/ Cotton-general crop (medium-sized)	46	2	2	50	17	2	12	69
Tobacco-livestock farms, Inner Bluegrass Area, Ky. 1/	29	12	3	56	20	21	8	51
Wheat farms:								
Wheat-small grain-livestock	17	4	--	79	8	13	6	73
Wheat, Southern Plains	11	18	--	71	5	23	3	69
Wheat-pea, Pacific Northwest	15	7	2	76	9	7	2	82
Cattle ranches, Intermountain region 1/	16	12	--	72	15	21	--	64

1/ 1957-59 price weights.
2/ Cotton-general crop farm (medium-sized).

VERTICAL COORDINATION IN AGRICULTURE

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This article is directed to 4 questions.

1. What is vertical coordination?
2. How much exists in agriculture?
3. What trends are there in vertical coordination?
4. What does it mean?

All 4 questions could be answered quickly in about this way: Vertical coordination has to do with organizational arrangements for production and marketing processes. It is universal; no production can go on without it in agriculture or anywhere else. There are no apparent trends, but only continuous change. The existence of a variety of ways of coordination, and the possibility of choosing different combinations of ways of coordination, make possible more economical production. All these statements are correct, but they need elaboration.

What is Vertical Coordination?

By vertical coordination, we mean all of the ways in which successive stages of producing any good or service can be controlled, managed, or directed. If we examine the situation for almost any product or service, we will find a variety of ways of vertical coordination in operation. Very few, if any, products result from only one method of vertical coordination. Take a quart of milk, for example. To produce the milk that supplies your breakfast table involves a long series of successive steps or stages. You can easily make a diagram that will show these steps in a long line reaching back through physical distribution, processing, collection, milking, feeding, growing or buying the feed, breeding the cattle, and so on. Subsidiary and supporting lines of vertical stages can be traced for the provision of formula feeds, milking machines, and other production supplies and equipment.

How are all of these vertical activities coordinated? Some are coordinated within a single business firm. This is vertical integration. Some are coordinated between firms by agreements or contracts. This is contract production. Some are coordinated through cooperative arrangements. This is mutual cooperation. Some involve market purchases and sales. This is the market-price system. All of these are familiar means of vertical coordination. Many involve horizontal coordination as well.

By horizontal coordination, we mean the operation of multiple units at the same stage of production. This is essentially an increase in the scale of operation. For example, a broiler grower who operates 5 broiler houses is horizontally coordinating more than a grower who operates only 2 houses.

In agriculture, we have all of the varieties of vertical coordination operating in various combinations. In recent years certain kinds of coordination, particularly some forms of contracting and vertical integration, have attracted special attention. But even these kinds have a long and interesting history.

The changes that attract the most attention are those that take place rather rapidly, as in the instance of commercial broilers. Many equally significant changes that occur gradually are less noticed. Changes in coordination that involve the rather clear separation of a process from the farm scene also usually cause less concern. When the cream separator moved to town, or when seed corn production left the farm for a specialized hybrid seed corn business, no one worried very much.

But when an outside business firm takes over the operation of some processes that remain physically located on the farm, and sends around a field man to advise the farmer, this may arouse more comment, at least until arrangements become well established and customary.

Distrust of the unknown and unfamiliar is a basic part of human psychology. Those who are outside the orbit of contract development are often fearful that the farmer's independence may be on the way out. But this doesn't seem to bother most of those who are actively participating. Vertical elements may be transferred, but this may be many times compensated for by increased horizontal opportunities. By specializing in the phases of the business in which they are best qualified, many farmers may have greatly increased their earning power. A broiler grower, for example, may, through a contract arrangement, produce 4 lots of 10,000 birds each in one year. This is possible because the contracting agency supplies financing and skilled help on disease and nutrition problems. These things enable the grower to specialize in the daily care and management of several times the number of birds he could handle before contracting was undertaken.

How Much Exists in Agriculture?

Meaningful consideration of the extent of vertical coordination must be built around the extent of particular kinds. The 1960 Sample Survey of Agriculture, recently published by the U. S. Bureau of the Census, contains some information on contract production for certain farm products. 11/ The sample size was limited and for several reasons underestimates the extent of contracting. It shows that, for 14 specified farm products, approximately 4.5 percent of all farm operators reported they had contracts relating to production or marketing. Considering products omitted and sampling inadequacies, it may be that as many as 20 percent of all farm operators are involved in contracting.

11/ U. S. Bureau of the Census. U. S. Census of Agriculture, 1959, Vol. V. Special Reports Part V., 1960. Sample Survey of Agriculture, 1962.

Cooperation as a means of coordination is participated in by about 4 in every 5 farmers. USDA's Farmer Cooperative Service estimates that about one-fourth of all farm products sold and one-fifth of basic farm supplies purchased are handled by cooperatives. Because some marketing cooperatives use contracts, there is some overlapping between the estimates for contracting and those for cooperation.

Farm products in which contracting is especially important include fluid milk, broilers, turkeys, sugar crops, citrus fruits, processed vegetables, hybrid seed corn, vegetable seeds, and many special crops.

Cooperative marketing is especially significant in dairy products, citrus, and other fruits.

Open production, for whatever the market-price system will bring after the commodity is produced, characterizes most of the great staple crops such as cotton, corn, wheat, and soybeans, and a large part of the livestock output.

An interesting point brought out in the Census study referred to above is that the proportion of farmers reporting contract production increases sharply with size of farm. One-sixth of the Class I farms reported contracting, compared with only 2 percent of the Class VI farms. (Class I farms are those with gross sales of $40,000 or more. Class VI farms have gross sales of less than $2,500.) Contract production appears to be positively associated with the larger commercial farm operations. Contracting is closely related to specialization and this to larger-scale, more profitable family-farm operations.

Contracting for farm products is carried on in many instances that are so familiar as to be overlooked in appraising its general extent. We can better appreciate this if we divide contracts into 3 groups, which may be called market-specification contracts, production-management contracts, and resource-providing contracts.

Market-specification contracts mainly provide an advance market for a product that meets certain specifications. The producer is relieved of certain risk and management decisions. Fluid-milk contracts usually are in this group.

Production-management contracts are like the preceding, but call for more participation in management by the contractor. The contractor may specify farm practices and send a field man to see that the practices are carried out. Contracts for sugarbeets, sweet corn, and tomatoes may be considered in this group.

Resource-providing contracts go still further and the contractor furnishes appreciable quantities of production resources. Commercial broiler contracts exemplify this group.

What Trends are There in Vertical Coordination?

It is change, rather than trends, that characterizes the vertical coordination picture in the aggregate. Contrasting and opposing changes in coordination are likely to be in progress in different parts of the agricultrual economy at the same time. The change is toward integration in one type of farm production, and away from it in another. Here contracting increases, there independent operation. Various adjustments are made to fit changing conditions.

In commercial feed lots for cattle, for example, we are witnessing a complex development which involves contracting, independent operation, integration of feed-mixing with feeding operations -- a whole new pattern.

A recent issue of a financial journal carried a story about contract arrangements for growing oats that are being made for the first time by a large breakfast cereal company. 12/ The oats crop in the United States has been shrinking, and this company is experiencing difficulty in getting an adequate supply of high-quality oats for its product. It is taking this way of assuring an adequate supply of the right quality within a reasonable distance. The company's action follows from the economic changes flowing from the passing of the horse and the introduction of soybeans in the Corn Belt economy.

Some of the Meaning

If a variety of flexible coordination devices were not available to cushion adjustments to changes in technology, supply, and demand, farmers would have much more serious problems of adjustment.

There is an interesting connection between vertical coordination and the current status of the family farm. Agriculture is one of the few places in the national economy in which so-called family operations still constitute the norm. The reason is that the family kind of operation remains efficient, perhaps more efficient than large-scale operations in most kinds of farming.

One of the main reasons that it remains efficient is that organizational adjustments involving changes in coordination have been possible. Many processes, once carried out on the farm, have been transferred to nonfarm businesses. This is true of both production supplies and farm products. Contract production has had a significant role in this whole adjustment. If this means of vertical coordination had not been possible, large chunks of agriculture that are still firmly in family farms might have become integrated because of the necessity of maintaining quality and certainty of supplies for processing operations.

12/ The Wall Street Journal, Tuesday March 12, 1963, p. 1.

EFFICIENCY GAINS IN BROILER PRODUCTION

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Broiler production in the United States is a highly competitive industry. Supplies and prices rapidly reflect changes in production efficiency. Since 1950, the industry has experienced a large increase in efficiency, a tremendous expansion in output, and a substantial reduction in prices received for broilers.

Production Efficiency

The increase in the efficiency of broiler production is mainly reflected in the decreases in feed, labor, and buildings and equipment used, per pound of broiler produced.

Perhaps the most important of these is the improvement in feeding efficiency. The average feed-conversion ratio (pounds of feed used to produce a pound of live broiler) for the United States as a whole declined from 3.25 in 1950-51 to 2.45 in 1960-61, or 25 percent (table 16). The use of improved broiler strains, more effective methods of disease prevention and control, better management, and improved broiler rations have enabled growers to get faster and more economical liveweight gains, with smaller mortality, than in previous years. These appear to have been the main factors in the improved feeding efficiency.

Substantial improvements in feeding efficiency were achieved during this period in 3 important broiler-producing areas for which data are available -- Maine, the Delmarva Peninsula, and Georgia. 13/ Of the 3, Maine showed the greatest improvement. Part of the reason for this was that, at the beginning of the period, Maine was producing a much heavier broiler than either of the other 2 areas. These heavier broilers require more feed per pound of gain than lighter birds. Thus, the drop of 0.3 pound by 1960-61 in the average liveweight of Maine broilers helped to improve feeding efficiency in the area. In addition, Maine broiler contractors in recent years have been using a higher proportion of fats and oils in their rations than formerly. It generally requires less of these high-energy feeds to produce a pound of broiler than the less-concentrated feeds used in some other areas.

Maine broilers still average somewhat heavier than those produced in the other 2 areas. There is some market demand for a heavier bird, and Maine's cooler climate and better housing give it a relative advantage over other areas in the production of a larger broiler.

For the United States as a whole, labor used per 100 pounds of broilers declined from an average of 3.10 hours in 1950-51 to slightly less than an hour 10 years later, a drop of about two-thirds (table 17). On contract

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13/ The Delmarva Peninsula bounds the Chesapeake Bay on the east. It is made up of the State of Delaware and the "Eastern Shore" counties of Maryland and Virginia.

Table 16. - Feed conversion rates for broilers, United States and specified areas 1950-51, 1955-56, and 1960-61

Period	United States		Maine		Delmarva Peninsula		Georgia	
	Feed con-version 1/	Broiler live-weight 2/	Feed con-version 3/	Broiler live-weight 2/	Feed con-version 1/	Broiler live-weight 2/	Feed con-version 4/	Broiler live-weight 2/
	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds
1950-51	3.25	3.10	3.85	4.20	3.55	3.00	3.30	2.80
1955-56	2.80	3.15	2.90	3.60	2.70	3.20	2.80	3.10
1960-61	2.45	3.40	2.30	3.90	2.30	3.70	2.40	3.30
	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Change, 1950-51 to 1960-61	-25	+10	-40	-7	-35	+23	-27	+18

1/ Source: Unpublished data from Costs, Income, and Efficiency Branch, Farm Prod. Econ. Div., Econ. Res. Serv., USDA.

2/ Chickens and Eggs -- Farm Production, Disposition, Cash Receipts, Gross Income, Statis. Bul. 183, 1956, and Statis. Bul. 287, 1961; Chickens and Eggs -- Farm Production, Disposition, Cash Receipts and Gross Income ....Pou. 2-3 (62) April 1962 and Pou. 2-3 (63) April 1963, Statis. Rptg. Serv., USDA.

3/ Source: Unpublished data from Department of Agricultural Economics, University of Maine.

4/ Source: Unpublished data from Department of Poultry Science, University of Georgia.

broiler farms in Maine, only 0.76 hour of labor was used per 100 pounds of broilers produced in 1960-61. Increased mechanization, better broiler-house layout, and labor savings with the larger production units are the main reasons for this improved labor efficiency, along with decreases in growing time per flock and the lower mortality rates.

Table 17. - Labor used per 100 pounds of broilers produced, United States and specified areas, annual averages, 1950-51, 1955-56, and 1960-61

Period	Labor used per 100 pounds of broiler produced			
	United States	Maine 1/	Delmarva Peninsula 1/	Georgia 1/
	Hours	Hours	Hours	Hours
1950-51------	3.10	2.19	1.97	2.37
1955-56------	1.48	1.50	1.26	1.44
1960-61------	.98	.76	.82	1.00
	Percent	Percent	Percent	Percent
Change, 1950-51 to 1960-61---	-68	-65	-58	-58

1/ For typical contract broiler farms; not necessarily the same as for the entire State or region.

Source: Costs, Income and Efficiency Branch, Farm Prod. Econ. Div., Econ. Res. Serv., USDA

The more rapid weight gains also contributed to improved efficiency in the use of buildings and equipment during this period, because the fixed plant is tied up for a shorter period of time per flock, and thus more flocks can be produced per year. In 1950-51, typical broiler producers in Maine averaged about 2.65 lots per year, but 10 years later were up to more than 4 lots per year (table 18). The average liveweight of Maine broilers declined about 7 percent in this period, while market age was being cut by 4 weeks, or nearly 30 percent. In the Delmarva Peninsula, the increase was from 3.35 lots annually to 4.2, and Georgia went from 3.0 lots to 3.85.

Table 18. - Time required to grow broilers, and market weight, United States and specified areas, averages, 1950-51, 1955-56, and 1960-61

Period	Maine			Delmarva Peninsula			Georgia		
	Market age 1/	Lots per year 1/	Live-weight per broiler 2/	Market age 1/	Lots per year 1/	Live-weight per broiler 2/	Market age 1/	Lots per year 1/	Live-weight per broiler 2/
	Weeks	Number	Pounds	Weeks	Number	Pounds	Weeks	Number	Pounds
1950-51---	13.5	2.65	4.2	12.2	3.35	3.0	11.7	3.00	2.8
1955-56---	10.6	3.90	3.6	10.0	3.85	3.2	9.8	3.40	3.1
1960-61---	9.6	4.10	3.9	9.6	4.20	3.7	9.4	3.85	3.3

1/ Source: Unpublished data from Costs, Income and Efficiency Branch, Farm Prod. Econ. Div., Econ. Res. Serv., USDA.

2/ Chickens and Eggs -- Farm Production, Disposition, Cash Receipts, Gross Income, Statis. Bul. 183, 1956, and Statis. Bul. 287, 1961; Chickens and Eggs -- Farm Production, Disposition, Cash receipts and Gross Income ....Pou. 2-3 (62) April 1962 and Pou. 2-3 (63) April 1963, Statis. Rptg. Serv., USD.

Although there has been an increase in the number of lots produced per year, it is usually not feasible to make the maximum possible use of buildings and equipment. Producers in each of these areas could produce 5 lots of birds annually by keeping cleanout time to a minimum. However, empty time between lots often is extended beyond that normally needed. Broiler contracting firms prefer to have their output relatively low at Thanksgiving and Christmas because of the competition from turkeys. And during periods of depressed prices, these contractors sometimes cut back production by dropping some of their less efficient growers, and, in some cases, by increasing the period between lots for other growers. During cold weather, they also place as few lots as possible in marginal housing in all areas. Moreover, a grower may request a delay in starting a new flock to allow time to harvest his crops, repair or remodel the broiler houses, or take a brief vacation.

Broiler Prices and Returns

The average of prices received for broilers at the farm in the United States dropped from 28.0 cents per pound in 1950-51 to 15.4 cents a decade later, or about 45 percent (table 19). Despite this decline in prices, broiler production in 1960-61 was nearly 3 times as large as it was 10 years before. Total liveweight production increased in each of these years. However, the pattern of these increases did show some indication of a price influence -- the annual production increase was generally smaller in years following those in which prices were below the long-term trend.

Table 19. - Production of broilers, and average farm prices received, United States, 1950-51, 1955-56, and 1960-61

Period	Production 1/	Farm prices 1/
	Mil. pounds	Cents per pound
1950-51	2,180	28.0
1955-56	3,810	22.4
1960-61	6,429	15.4
	Percent	Percent
Change, 1950-51 to 1960-61	+195	-45

1/ Chickens and Eggs-- Farm Production, Disposition, Cash Receipts, Gross Income, Statis. Bul. 183, 1956, and Statis. Bul. 287, 1961; Chickens and Eggs --Farm Production, Disposition, Cash Receipts and Gross Income...Pou. 2-3 (62) April 1962 and Pou. 2-3 (63) April, 1963. Statis. Rptg. Serv. USDA.

A high proportion of the broilers produced in the United States are grown by farmers under contract with feed dealers, processors, or other nonfarm firms; many feed dealers and processors also produce broilers in their own houses with hired labor. Where production is carried on under contract, the contractor supplies feed, medicine, and most other supplies, retains ownership of the birds, and makes most of the production and marketing decisions. The farmer, or grower, generally provides the buildings and equipment, labor, and sometimes certain other supplies, such as fuel. The farmer receives a payment as specified by the contract, and the contractor receives any profit or assumes any out-of-pocket loss.

Returns per pound to both contractors and growers decreased significantly during the 1950's in all 3 producing areas (table 20). Prices received in Georgia declined about 46 percent,and 39 percent in each of the other 2 areas during the decade. However, returns per pound to contractors declined more during this period than contract payments to farmers, so that the farmers' percentage share of gross returns increased slightly in all 3 areas during the decade.

Table 20. - Prices received for broilers and division of returns between broiler contracting firms and growers, averages for specified areas, 1950-51, 1955-56, and 1960-61

Area	1950-51		1955-56		1960-61	
	Cents per pound	Per-cent	Cents per pound	Per-cent	Cents per pound	Per-cent
Maine:						
Prices received 1/	27.55	100	21.52	100	16.77	100
Payment to grower 2/	3.39	12	3.17	15	2.65	16
Return to contractor 3/	24.16	88	18.36	85	14.12	84
Delmarva Peninsula:						
Prices received 1/	26.57	100	22.46	100	16.24	100
Payment to grower 2/	2.76	10	3.21	14	1.98	12
Return to contractor 3/	23.81	90	19.25	86	14.26	88
Georgia:						
Prices received 1/	26.85	100	21.19	100	14.61	100
Payment to grower 2/	3.36	13	2.72	13	2.07	14
Return to contractor 3/	23.49	87	18.48	87	12.54	86

1/ Chickens and Eggs -- Farm Production, Disposition, Cash Receipts, Gross Income, Statis. Bul. 183, 1956 and Statis. Bul. 287, 1961; Chickens and Eggs -- Farm Production, Disposition, Cash Receipts, and Gross Income ....Pou. 2-3 (62) April 1962, and Pou. 2-3 (63) April 1963, Statis. Rptg. Serv., USDA.

2/ From Costs, Income and Efficiency Branch, Farm Prod. Econ. Div., Econ. Res. Serv., USDA. This payment is the return for the grower's labor, use of buildings and equipment, and any other production items he furnished.

3/ This is the gross return which the contractor received for the chicks, feed, medicine, and other production supplies he furnished.

EFFICIENCY AND COST CHANGES IN COTTON PRODUCTION

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To what extent have increases in efficiency of U. S. cotton production offset the higher prices of items used in producing cotton? Research currently underway indicates that, from 1947 to 1961, efficiency gains substantially offset higher prices paid.[14] The overall increase in cotton production efficiency during this period can be attributed largely to the 50-percent increase in per-acre yield obtained with about a 20-percent larger quantity of inputs per acre. This enabled cotton farmers to produce an aggregate output in 1959-61 equal to that of 1947-49, but with about a third less acreage.

Gains in Efficiency

The increasing competition from synthetic fibers, coupled with advances in technology in other sectors of the economy, has made imperative continued adjustments toward greater efficiency in cotton production. Research and development by both private industry and public agencies have made available the more effective production inputs and production methods that have made possible the improvements in efficiency. Producers, in turn, have rapidly adopted the new techniques and practices and thereby effected marked shifts in the composition of production inputs. The substitution of nonfarm inputs--machinery, fertilizer, pesticides, etc.--for such inputs as land and labor is an important factor leading to increased efficiency through its impact on labor requirements, yields, and size of business. The following data indicate the major shifts in the composition of inputs used per bale of cotton:

Change from 1947-49 to 1959-61	Percent
Labor	-48
Irrigation	+71
Fertilizer	+23
Other materials	+140
Power and equipment	-10
Ginning	+3
Overhead	-20
Items excluding land	-21
Land	-15
Total inputs	-20

The total quantity of inputs used per bale dropped about 20 percent, whether we include or exclude land as an input.[15] Since the measurement and allocation of a land charge is necessarily somewhat arbitrary, the results of this analysis are presented both ways.[16]

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[14] Based on estimates made in preparing Changes in Costs and Efficiency of Cotton Production -- A Preliminary Report, Farm Prod. Econ. Div., Econ. Res. Serv.,USDA, Nov. 1962. Some minor revisions have been made subsequent to the issuance of the preliminary report. [15] Changes in production efficiency are measured in terms of changes in total inputs--quantities of labor, machinery, and so on -- used to produce a bale of cotton. A drop in inputs per bale denotes an increase in efficiency. [16] In this study, the land charge was obtained by prorating a total land charge on cotton farms to the cotton crop on the basis of the proportion of gross farm income derived from cotton. Cotton farmers usually depend on cotton to cover most of the indirect costs such as land. Returns above variable costs for crops other than cotton generally are not sufficient to cover land costs allocated strictly on a per-acre basis.

The large decrease in labor use per bale reflects the continued trend toward substitution of mechanical power and other nonfarm-produced items for hand labor and animal power. Marked reductions were made in both preharvest labor (50 percent) and harvest labor (46 percent) per bale produced. Mechanical power had almost completely replaced animal power by the end of the period. Mechanical harvesting has largely displaced hand harvesting in some areas, and is making substantial inroads in others. The development and adoption of improved chemical weed control methods promises to continue the reduction already achieved in hand-hoeing requirements.

The decrease of 10 percent in power and equipment inputs per bale obscures the important shifts taking place within that input group. Inputs of mechanical power and equipment increased 36 percent, but this was more than offset by a sharp reduction in inputs of animal power.

The "other materials" group includes seed, insecticides, herbicides, defoliants, and desiccants. Insecticides used per bale more than tripled over the period, and the use of herbicides increased phenomenally in the humid South, particularly in the Delta area. A greater use of defoliants and desiccants has accompanied the trend toward mechanical harvesting. These chemicals, along with fertilizer, will continue to be an important source of increased productivity in the future.

Efficiency Gains vs. Rise in Input Prices

The net effect of changes in efficiency and in prices paid on total cost per bale is shown in the following summary:

Change from 1947-49 to 1959-61	Percent
Items excluding land:	
Costs per bale	17/ -4
Inputs per bale	-21
Prices of inputs	+21
Items including land:	
Costs per bale	17/ +6
Inputs per bale	-20
Prices of inputs	+32

Excluding the charge for land, costs per bale would have decreased 4 percent from 1947-49 to 1959-61. But if land is included as an input, the cost per bale increases 6 percent. This difference is largely due to the sharp

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17/ The change in costs per bale is the product of the changes in inputs per bale and prices of inputs. For example, the drop of 4 percent in costs per bale when land is excluded from inputs, is the net result of the 21-percent drop in the quantity of inputs per bale, and the 21-percent increase in prices of inputs. That is, (100 - 21) x (100 + 21) = 96. After making the indicated additions and subtractions within the parentheses, this equation becomes 79 x 121 = 96. The 96 is the index number equivalent (1947-49=100) of the 4-percent drop in costs per bale during the period.

increase in the imputed cost rate of land (123 percent), compared with an average increase of only 21 percent in prices paid for other input items.

The gain of 20 percent in the efficiency of cotton production during this period about offset the higher prices paid for input items. But if there had been no increase in efficiency over the 1947-61 period, the average cost of production per bale in 1961 might have been 25 percent higher than in 1947-49. At 1961 prices, the savings resulting from this increase in efficiency would amount to about $600 million in 1961 alone.

Annual Variations

Substantial annual variations occurred in both inputs per bale and costs per bale, resulting largely from yield variations associated with weather and related factors (fig. 6). The relatively low per-acre yields of 1950, 1951, and 1957 caused both costs and inputs per bale to rise substantially above the longer-term trends. Although important year-to-year variations occurred, the changes between 1947-49 and 1959-61 reflect the broad trends in efficiency and costs of producing cotton in the United States during this period.

In summary, outstanding gains in efficiency have been attained in cotton production, and these gains have substantially offset the higher prices paid for items used in producing cotton. However, a continuing need exists for greater efficiency in view of the heightening competition from synthetic fibers and foreign supplies.

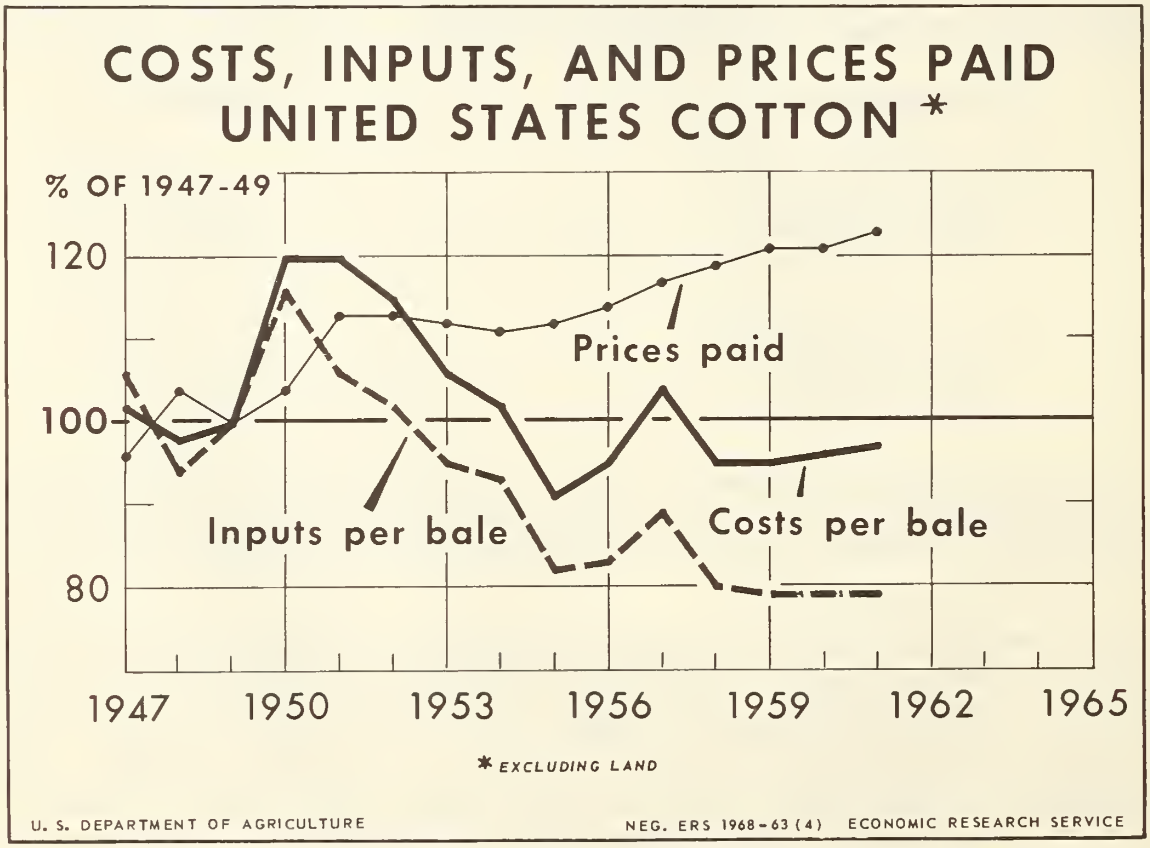

Figure 6

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